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American Society of Hospital Pharmacists



EFFECT OF AUTOCLAVING

of certain thermolabile substances

ISONICOTINIC ACID DERIVATIVES

in tuberculosis

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VOLUME 9 NUMBER 2

MARCH-APRIL 1952

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The BULLETIN

American Society of Hospital Pharmacists

MARCH-APRIL 1952
VOLUME 9 NUMBER 2

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LETTERS

Monthly Bulletin?

DEAR SIRs: I would like to compliment you on the excellence of THE BULLETIN. The only possible fault that I find is that it is not published monthly or weekly. Every issue provides a host of valuable information and inspiring ideas. I look forward to each issue . . . "

R. DAVID ANDERSON, *Chief Pharmacist*
King's Daughters' Hospital
Staunton, Va.

Flat Service Charge

DEAR SIRs: I am chief pharmacist in a 350-bed county hospital with an outpatient clinic of about 200 patients a day. Our institution is supported by the county and is for indigents, no charges whatsoever being made to the patients.

We are considering the feasibility of establishing a flat service charge for prescriptions in the outpatient clinic. We would therefore like to learn whether or not there are other institutions of this type using the flat service charge satisfactorily.

DAVID AXELROD, *Chief Pharmacist*
Maricopa County Hospital
Phoenix, Ariz.

EDITOR'S NOTE: *Hospital pharmacists in institutions using the plan mentioned in Mr. Axelrod's letter may write directly to him giving information on the advisability of a flat service charge for prescriptions in a county institution.*

Hospital Pharmacy Syllabus

DEAR SIRs: Thank you for your letter of November 30 and the copy of the *Proposed Syllabus For a Course in Hospital Pharmacy Administration*, and also the very excellent issue of THE BULLETIN. . . . we at the St. Louis College of Pharmacy are very much interested in what you are doing and in the possibility of introducing into our curriculum some work in hospital pharmacy.

A. F. SCHLICHTING, *Dean*
St. Louis College of Pharmacy
St. Louis 10, Mo.

From the A.A.A.S.

DEAR SIRs: I am pleased to inform you officially that, at the Philadelphia meeting of the AAAS, both the Executive Committee and the Council voted without dissent on the proposal that the American Society of Hospital Pharmacists be associated with the AAAS. Needless to say, I am happy to have this formal relation between our two organizations, and I am sure it will be mutually beneficial.

The only difference between an affiliate and an associate is that of representation on our Council. An associated society does not appoint a representative. It is our hope that your organization will consider the possibility of meeting with us at our annual convention, or at least of sponsoring or cosponsoring individual sessions or symposia. Often this can best be done through the section with which your group is associated. In your case it is the section on the medical sciences (N), the chairman of which is Doctor William S. McCann, the University of Rochester, and the secretary of the subsection on pharmacy is, as you know, Doctor Glenn L. Jenkins, Purdue University.

There may be matters of general interest on which our two organizations can cooperate; hence I trust I shall be in direct contact with you from time to time. In fact, we like to have in our files pertinent information about each of our associates, and I will appreciate it if you will fill out the enclosed card and return it promptly to this office.

HOWARD A. MEYERHOFF,
Administrative Secretary

American Association for the
Advancement of Science
Washington, D. C.

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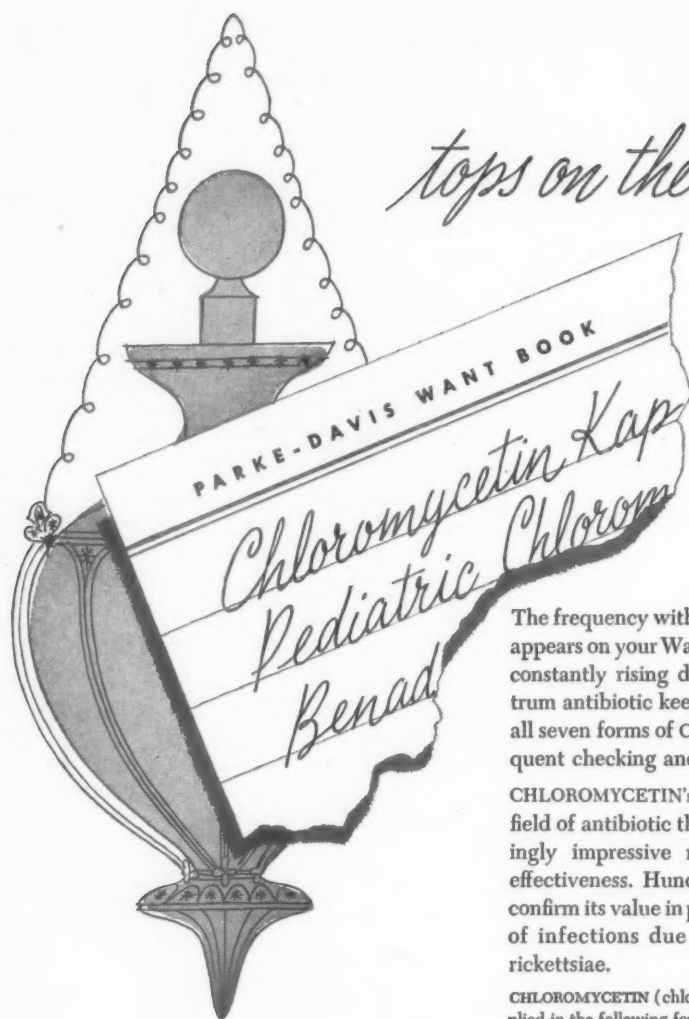
DEAR SIRs: Under separate cover we have returned to you the *University of Michigan Hospital Formulary* which was sent to us for loan. It has helped us a great deal in organizing ours. I thank you very much for this service and we appreciate the fact that we can turn to an organization such as ours for such help.

SISTER M. FRANCISCANA, *Chief Pharmacist*
St. Joseph's Hospital
Memphis 7, Tenn.

Appreciation of Services

DEAR SIRs: Please renew my membership in the ASHP. Your publication is excellent.

SFC. RICHARD E. WEBB, *R.Ph.*
Yong Dong Po, Korea
121 Evacuation Hospital,
APO 301, c/o Postmaster
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Two Matters Concerning Practical Experience

by DON E. FRANCKE

TWO MATTERS, one discouraging, the other reassuring, concerning practical experience in hospital pharmacy should be brought to the attention of the profession. The first is the paradoxical and hopeless situation in which recent graduates find themselves when they attempt to follow a career as pharmacist in the armed services. These pharmacists assigned to practice under the supervision of a pharmacy officer in Air Force, Army or Navy hospitals find themselves in this position: Since Boards of Pharmacy will allow them only six months credit for experience while in the armed forces, they can never become registered while in the service. Obviously the services will not give them six months off to obtain the additional practical experience in drugstores which some Boards of Pharmacy require. This ruling not only delays promotions and tends to discourage the choosing of a military career by the recent graduate, but in a larger sense it tends to lower the status of pharmacists in government service.

This is shortsighted action by our Boards and illustrates blind adherence to a rule which was passed for an entirely different purpose and was to be applied under vastly different circumstances. It is granted that this ruling was generous in the case of many who gained experience in limited pharmaceutical duties during the World War II, and in similar cases today it should not be changed. However, when the Medical Service Corps of the armed services establish splendid apprenticeship programs in their large, excellent, general hospitals, certainly Boards of Pharmacy should not give a blanket refusal to those trained under these conditions. It would appear reasonable to request that the Boards inspect and review the training given in these hospitals and to re-evaluate their decision to limit credit for experience in the light of the reality of this relatively new situation.

Action should be taken in this matter at once. Hospital pharmacists, and particularly Affiliated Chapters of the Society, are urged to discuss this matter with members of their Boards of Pharmacy and if possible to effect a solution. Since all Boards do not limit credit for experience obtained in Army or Navy hospitals to six months, a request for an official ruling on this matter from each Board would appear desirable. This ruling evidently does not apply to Public Health Service or Veterans Administration Hospitals where full credit is given by most Boards.

Our profession has battled long years to raise the status of pharmacists in the armed services. Let us not destroy the gains we have made.

MORE ENCOURAGING is a recent opinion of the attorney general of Wisconsin who states that it is mandatory for the Board of Pharmacy to allow full credit, rather than six months credit, for experience obtained in a licensed hospital pharmacy. This opinion was obtained by the Wisconsin Board of Pharmacy at the request of the Wisconsin Society of Hospital Pharmacists.

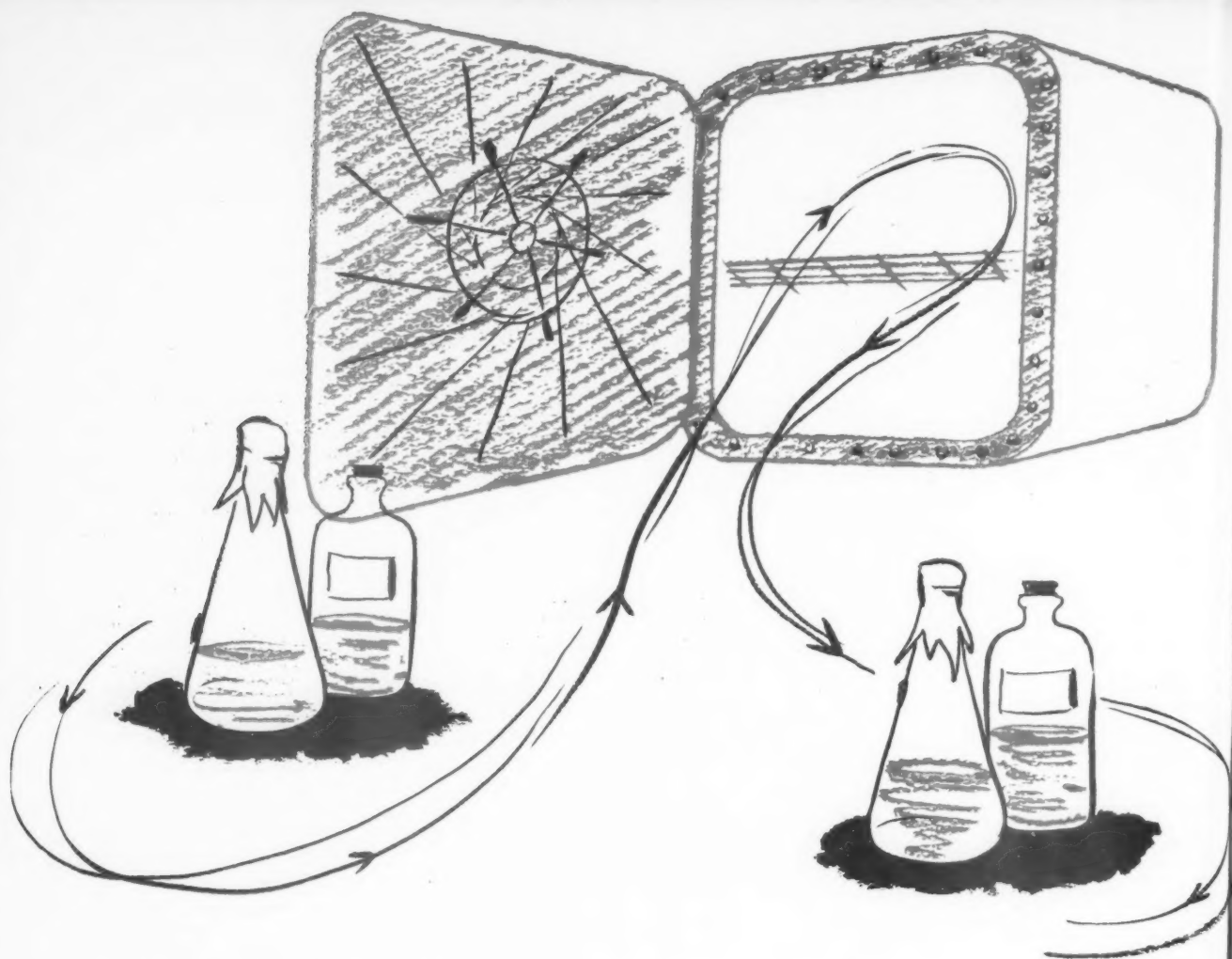
Pertinent portions of the opinion read:

The statute, sec. 151.02 (2) (a), uses the words *retail pharmacy or drug store* without qualification although the nature of the training to be received is outlined in some detail. While ch. 151 does not specifically define the term retail pharmacy or drug store, sec. 151.02 (2) (9) provides in substance that no drug store, pharmacy, apothecary or any similar place of business shall be open or kept open for the transaction of business until it has been registered with and a permit therefor has been issued by the state board of pharmacy.

Sec. 151.02 (10) provides in part that every pharmacy shall be equipped with proper pharmaceutical utensils so that compounding of prescriptions and dispensing of medicaments can be properly performed. The board of pharmacy, with advice and consent of the faculty of the University of Wisconsin school of pharmacy, is directed to prescribe the minimum standards of professional and technical equipment. The section further provides that no permit shall be issued unless the provisions of this section have been met and that no permit shall be issued or continued unless the premises are equipped with proper sanitary appliances and are kept in a clean and orderly manner. Presumably any retail pharmacy or drug store having complied with all requirements of sec. 151.02 (9) and (10) and having been issued a permit pursuant thereto would qualify for all intents and purposes as a retail pharmacy or drug store under sec. 151.02 (2) (a), and the board would be placed in an anomalous position if it were to disapprove for pharmaceutical training purposes a retail drug outlet which it has seen fit to license under sec. 151.02 (9). If a particular drug outlet, whether operated by a hospital or an individual, does not comply with the minimum standards of sanitation, equipment, etc. prescribed by the board and the university under sec. 151.02 (10), it ought not to be licensed, and if not licensed, it could not be kept open nor furnish pharmaceutical training.

It is our opinion that pharmaceutical training in a licensed retail pharmacy operated by a hospital, under the direction and supervision of a registered pharmacist, must be given full credit by the board under sec. 151.02 (2) as a part of the 5 year training required for a pharmacy license.

This, again, illustrates what can be accomplished through democratic action by interested groups. Congratulations to the Wisconsin Society of Hospital Pharmacists.



THE EFFECT OF autoclaving ON THE stability OF SOLUTIONS

OF CERTAIN THERMOLABILE SUBSTANCES

By JOHN T. MURPHY and MITCHELL J. STOKLOSA

Although it has been suggested that sterilization by steam under pressure is probably the most satisfactory of the recognized methods, its usefulness, in the case of aqueous solutions, is restricted to those that are not harmed by the heat employed.

JOHN T. MURPHY is pharmacist-in-chief at the Massachusetts General Hospital and consultant in hospital pharmacy, Massachusetts College of Pharmacy, Boston, Massachusetts.

MITCHELL J. STOKLOSA is an assistant professor of pharmacy at the Massachusetts College of Pharmacy, Boston, Massachusetts.

Autoclaving, therefore, has not been recommended for the sterilization of solutions of certain thermolabile substances, particularly some of the salts of atropine, cocaine, codeine, dihydromorphinone, methadone, morphine, procaine and scopolamine. Consequently, the hospital pharmacist who prepares sterile solutions of these alkaloidal salts is confronted with the problem of selecting a sterilization procedure that will have no undesirable effects on the medicaments, a procedure that will not cause any marked deterioration as might be shown by reduced potency.

Several years ago, the Department of Pharmacy at the Massachusetts General Hospital was confronted with this problem when all hypodermic tablets used routinely in the hospital were replaced with sterile injections. The change in the form of medication was made in order to conserve nursing time, to ensure sterility, and to provide greater flexibility in computing fractional doses. While it was felt that autoclaving, under proper conditions, might be suitable for the sterilization of these injections, the possibility of any unfavorable effect of the heat employed in the process had to be considered.

A review of the literature¹ indicated that the sterilization processes variously recommended for some of the drugs mentioned included autoclaving (Process C), moist heat at 100° C. (Process D), moist heat at low temperature (Process E), and bacteriological filtration (Process F). More specifically, it has been suggested that solutions of morphine sulfate and codeine sulfate should be sterilized by Process D;² that procaine solutions were decomposed with high temperature and should, therefore, be sterilized by Process D;³ that, although cocaine hydrochloride solutions may be sterilized at 100° C. and remain comparatively stable for several months, Process E or Process F was undoubtedly preferable;⁴ and that the sterilization of morphine sulfate should be conducted with a minimum of heat and that Process F should be used.⁵ It should also be noted that, at present, the official compendia make no suggestion or recommendation concerning sterilization procedures for the official injections or solutions of the drugs mentioned in this paper.

In view of the somewhat indefinite evidence regarding safe sterilization methods for certain thermolabile drugs, this preliminary study was undertaken in an attempt to determine the effect of autoclaving on the stability of solutions prepared from them. Although the investigators were concerned, primarily, with the effect of autoclaving on the solutions that replaced the hypodermic tablets in the hospital, the thermostability of cocaine hydrochloride and procaine hydrochloride in solution was also studied.

EXPERIMENTAL

A series of eleven solutions was prepared according to the formulas that follow.

ATROPINE SULFATE INJECTION (1.2 CC. = 0.6 MG.)

Atropine Sulfate	0.05 Gm.
Sodium Chloride	0.625 Gm.
Sodium Bisulfite	0.1 Gm.
Chlorobutanol	0.5 Gm.
Distilled Water, to make	100.0 cc.

COCAINE HYDROCHLORIDE SOLUTION, 4%

Cocaine Hydrochloride	4.0 Gm.
Sodium Chloride	0.5 Gm.
Chlorobutanol	0.5 Gm.
Amaranth Solution, 0.25%	0.2 cc.
Distilled Water, to make	100.0 cc.

COCAINE HYDROCHLORIDE SOLUTION, 10%

Cocaine Hydrochloride	10.0 Gm.
Chlorobutanol	0.5 Gm.
Amaranth Solution, 0.25%	0.2 cc.
Distilled Water, to make	100.0 cc.

CODEINE PHOSPHATE INJECTION (1.2 CC. = 60 MG.)

Codeine Phosphate	5.0 Gm.
Sodium Bisulfite	0.1 Gm.
Chlorobutanol	0.5 Gm.
Distilled Water, to make	100.0 cc.

DIHYDROMORPHINONE HYDROCHLORIDE INJECTION (1.2 CC. = 4 MG.)

Dihydromorphinone Hydrochloride	0.333 Gm.
Sodium Chloride	0.58 Gm.
Sodium Bisulfite	0.1 Gm.
Chlorobutanol	0.5 Gm.
Distilled water, to make	100.0 cc.

METHADONE HYDROCHLORIDE INJECTION (1 CC. = 10 MG.)

Methadone Hydrochloride	1.0 Gm.
Sodium Chloride	0.9 Gm.
Sodium Bisulfite	0.1 Gm.
Chlorobutanol	0.5 Gm.
Distilled Water, to make	100.0 cc.

MORPHINE SULPHATE INJECTION (1.2 CC. = 15 MG.)

Morphine Sulfate	1.25 Gm.
Sodium Bisulfite	0.1 Gm.
Chlorobutanol	0.5 Gm.
Distilled Water, to make	100.0 cc.

PROCAINE HYDROCHLORIDE SOLUTION, 1%

Procaine Hydrochloride	1.0 Gm.
Sodium Chloride	0.63 Gm.
Sodium Bisulfite	0.1 Gm.
Hydrochloric Acid, 0.1N	1.0 cc.
Distilled Water, to make	100.0 cc.

PROCAINE HYDROCHLORIDE SOLUTION, 4%

Procaine Hydrochloride	*2.0 Gm.
Sodium Bisulfite	0.1 Gm.
Hydrochloric Acid, 0.1N	1.0 cc.
Distilled Water, to make	100.0 cc.

PROCAINE HYDROCHLORIDE SOLUTION, 2%

Procaine Hydrochloride	4.0	Gm.
Sodium Chloride	0.415	Gm.
Sodium Bisulfite	0.1	Gm.
Hydrochloric Acid, 0.1N	1.0	cc.
Distilled Water, to make	100.0	cc.

SCOPOLAMINE HYDROBROMIDE INJECTION

(1.2 CC. = 0.6 MG.)

Scopolamine Hydrobromide	0.05	Gm.
Mannitol	10.0	Gm.
Chlorobutanol	0.5	Gm.
Distilled Water, to make	100.0	cc.

The amount of each solution that was prepared represented the quantity in order to fill the number of vials that are routinely required manufactured for floor use in the hospital. This volume varied from 4000 cc. to 8000 cc. The chemicals were dissolved in pyrogen-free distilled water. When included in a formula, sodium chloride was used to produce isotonicity, and sodium bisulfite to serve as an antioxidant. Chlorobutanol was used, where indicated, as a preservative. Mannitol was added to the Scopolamine Hydrobromide Injection for the purpose of stabilization. In each case, the solution was filtered through a sintered-glass funnel. The hydrogen-ion concentration was determined by means of a Beckman pH meter, and, if necessary, the value was adjusted to a pH of 4 to 5. The pH values, before sterilization, are given in Table I.

A sample of each solution was assayed according to the pharmacopeial method for alkaloidal drugs. The extraction apparatus (Fig. 1 and 2) that was used in the assays was a modified Watkins Alkaloidal Extractor.⁶ The apparatus consists essentially of an outer glass jacket with a bent side tube which connects to an Erlenmeyer flask. A condenser fits into the upper end of the jacket. For the extraction of alkaloidal solutions with immiscible solvents lighter than water, an inner tube made with a funnel top and an enlarged lower end with small openings, which break the solvent into a spray of droplets, is used in the jacket. For solvents heavier than water, a much wider tube that is open at both ends is used.

The apparatus requires only a small amount of solvent, needs practically no attention and gives a clear and complete extraction in one operation. The results of the assays, before sterilization, are given in Table II.

The filtered solution was filled, in each instance, into properly cleaned and sterilized borosilicate (Neutraglass) vials of the capacity indicated in Table III. The vials were capped with rubber closures and the caps were sealed

TABLE I
pH VALUES BEFORE AND AFTER STERILIZATION

	pH BEFORE STERILIZATION	pH AFTER STERILIZATION
Atropine Sulfate Injection	4.1	3.3
Cocaine Hydrochloride Solution, 4%	3.8	3.2
Cocaine Hydrochloride Solution, 10%	3.6	3.2
Codeine Phosphate Injection	4.3	3.9
Dihydromorphinone Hydrochloride Injection	4.6	3.4
Methadone Hydrochloride Injection	4.1	2.9
Morphine Sulfate Injection	4.5	3.5
Procaine Hydrochloride Solution, 1%	3.9	3.4
Procaine Hydrochloride Solution, 2%	4.1	3.6
Procaine Hydrochloride Solution, 4%	4.1	3.5
Scopolamine Hydrobromide Injection	4.8	3.4

with aluminum seals. All of the vials were checked for clarity, and then each lot was sterilized by autoclaving at the temperature and for the length of time indicated in Table III.

After sterilization, samples of each lot were checked for sterility, for pH value and for any visual evidences of deterioration. The pH values, as shown in Table I, dropped slightly in all cases. Since the pH of a 0.5% solution of chlorobutanol drops from about 5.5 to 2.8 after sterilization and since a sterilized solution of it gives a positive test with silver nitrate solution, it was concluded that the reduction in pH of the solutions was probably due to a hydrolysis of the chlorobutanol that was used in the formulations. Inspection of the solutions revealed no evidences of deterioration such as might be shown by a change in color or by precipitation. Samples of each lot were then assayed to determine the effect of the heat that was used in the autoclaving process on the potency of the solution. The results of the assays, after sterilization, are given in Table II. A study of the results in the table seems to indicate that sterilization by steam under pressure had no significant effect on the potency of the solutions that were investigated. The authors are grateful

to Miss Shirley Albert of the Pharmacy Staff of the Massachusetts General Hospital who assayed all of the solutions studied in this investigation.

In order to determine the stability of the sterilized solutions when stored over an extended period of time, samples of each lot were subjected to shelf testing. Although this phase of the work has not yet been completed, available data seem to indicate (1) that there is no visual evidence of deterioration in any of them and (2) that none of the solutions will show a reduced potency of over 5 percent when stored for 11 months.

CONCLUSION

On the basis of the data reported, it seems logical to conclude that solutions of certain thermolabile substances may be sterilized by autoclaving, under properly controlled conditions, without significantly affecting their potency. Three factors may be cited as contributing, in some measure, to the thermostability of the solutions investigated. First, the containers used for the solutions were made of boro-silicate glass, a hard glass that does not impart alkalinity to the so-

TABLE II
ASSAYS BEFORE AND AFTER STERILIZATION

	ASSAY BEFORE STERILIZATION PERCENT (w/v)	ASSAY AFTER STERILIZATION PERCENT (w/v)
Atropine Sulfate Injection	0.05	0.05
Cocaine Hydrochloride Solution, 4%	3.90	3.90
Cocaine Hydrochloride Solution, 10%	9.83	9.80
Codeine Phosphate Injection	5.15	5.05
Dihydromorphinone Hydrochloride Injection	0.33	0.32
Methadone Hydrochloride Injection	1.02	1.01
Morphine Sulfate Injection	1.21	1.20
Procaine Hydrochloride Solution, 1%	1.00	0.99
Procaine Hydrochloride Solution, 2%	1.98	1.97
Procaine Hydrochloride Solution, 4%	3.98	3.90
Scopolamine Hydrobromide Injection	0.05	0.05

TABLE III
STERILIZATION TEMPERATURES AND TIME

	SIZE OF VIAL (cc.)	STERILIZATION	
		TEMPER- ATURE (° C.)	TIME (MIN- UTES)
Atropine Sulfate Injection	20	121	7
Cocaine Hydrochloride Solution, 4%	15	121	7
	and 30	121	7
Cocaine Hydrochloride Solution, 10%	15	121	7
	and 30	121	7
Codeine Phosphate Injection	20	121	7
Dihydromorphinone Hydrochloride Injection	10	121	5
Methadone Hydrochloride Injection	10	121	5
Morphine Sulfate Injection	20	121	7
Procaine Hydrochloride Solution, 1%	50	121	10
Procaine Hydrochloride Solution, 2%	10	121	5
	and 50	121	10
Procaine Hydrochloride Solution, 4%	10	121	5
Scopolamine Hydrobromide Injection	10	121	5

lution. The use of a soft glass container undoubtedly would have affected the pH values of the solutions. Secondly, the pH values of the solutions, before and after sterilization, were, in all cases, within a range of from 2.9 to 4.8. There is evidence to indicate that this seems to be the optimum pH range for maximum stability of solutions of certain alkaloidal salts. Finally, the time used for the sterilization of the solutions that were studied was governed in accordance with the size of the container.

BIBLIOGRAPHY

1. Cook, E.F. and Martin, E.W.: *Remington's Practice of Pharmacy*, The Mack Publishing Company, Easton, Pa., 10th ed., 1951, p. 270.
2. Sister Henrietta: Narcotics in Sterile Solutions, *Bull. Am. Soc. Hosp. Pharm.* 5:124 (May-June) 1948. (Reprint)
3. Cook, E.F. and Martin, E.W.: *Remington's Practice of Pharmacy*, The Mack Publishing Company, Easton, Pa., 9th ed., 1948, p. 623.
4. *Ibid.*, p. 620.
5. *Ibid.*, p. 813.
6. Palkin, S., Murray, A.G., and Watkins, H.R.: Automatic Devices for Extracting Alkaloidal Solutions, *Ind. Eng. Chem.*, 17, 612 (1925).

Tuberculous mice 19 days after infection. The untreated mouse on the left died a few hours after this picture was taken. The other, treated with isonicotinic acid hydrazide, was still healthy at 35 days, was eventually chloroformed.



ISONICOTINIC ACID derivatives in TUBERCULOSIS

A SHORT REVIEW TO PRESENT TO HOSPITAL PHARMACISTS WHAT FRAGMENTARY DATA IS AVAILABLE AT THE PRESENT TIME. NO CONCLUSIONS AS TO THE EVENTUAL POSITION OF THESE DRUGS IN TUBERCULOSIS IS WARRANTED UNTIL A GREATER VOLUME OF CAREFULLY CONTROLLED WORK IS DONE.

AT the present time the entire medical profession and those affiliated with it find themselves in a rather peculiar position regarding the newest antituberculous drugs, namely, the hydrazide and isopropyl derivatives of isonicotinic acid. This has come about through the unfortunate premature release of the results of preliminary investigations with these drugs to the lay press, before any reports of controlled studies were available in professional journals. We have found ourselves unable to answer many questions which are being asked regarding them because of this; and it is for this reason that we are now attempting to briefly summarize the few available reports. At this point it seems wise to mention that several journals of tuberculosis are going to devote their April issues to these investigations, thereby making available more extensive and accurate reports regarding these drugs.

HISTORY

The first synthesis of isonicotinic acid was carried out by two German students in 1912. At that time no significant uses for this drug were realized so it was promptly placed on the shelf and forgotten. Recently two American and one Spanish group of investigators, who were looking for any drugs with antituberculous activity, independently resynthesized this chemical and carried out a few tests which showed that it was worthy of further study. The reason that all three groups happened to resynthesize the same drug

at the same time was that they were attempting to test all of the possible derivatives of the thiosemicarbazone series of drugs, which had previously been shown to have a mild antagonistic effect to the tubercle bacillus. Among the derivatives of the thiosemicarbazone series, occurs the hydrazide of isonicotinic acid and each investigator found that this was more active and less toxic than the original drug.

CHEMICAL PROPERTIES

Isonicotinic acid hydrazide is a white needle-shaped crystalline chemical extremely soluble in water, alcohol, and most polar solvents. It has a melting point of from 168-173° C.

EXPERIMENTAL RESULTS

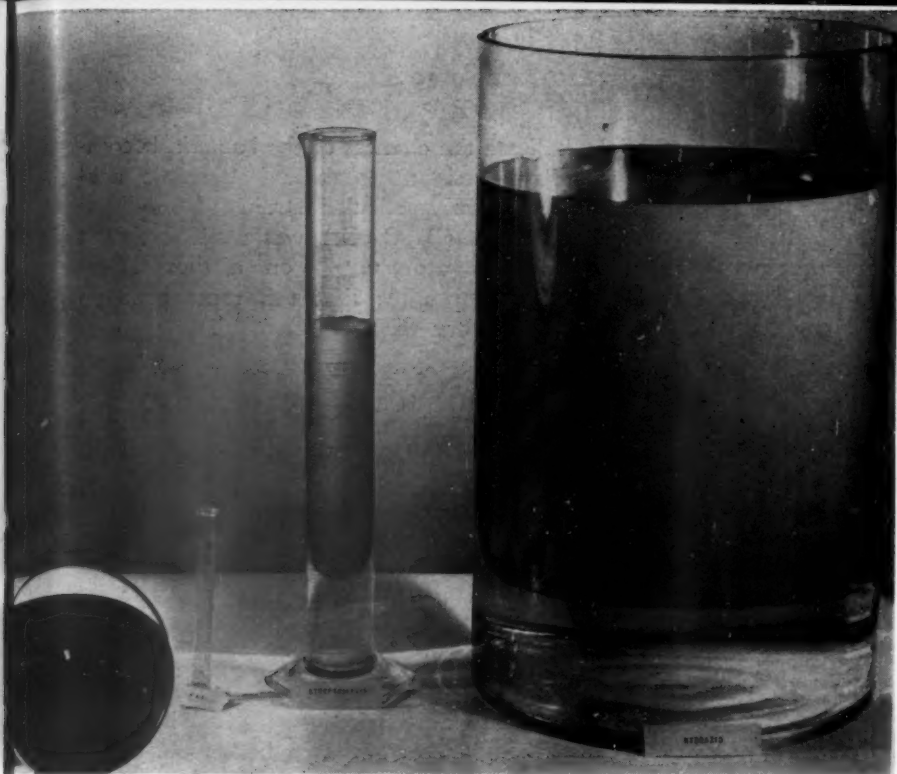
Because of its simpler structure most of the studies carried out up to the present time have used the hydrazide of isonicotinic acid. Some investigators feel that the isopropyl form will be shown to be equally as effective.

In vitro studies have shown that these compounds are definitely effective against cultures of highly pathogenic tubercle bacilli. As little as 0.02 to 0.06 mcgm/ml. of isonicotinic acid hydrazide will prevent the growth of these cultures.

It is also of interest that this group of drugs is essentially ineffective against any other organisms with the possible exception of a slight antagonism to some fungi. That is to say that streptococci, staphylococci, pneumococci, colon-bacilli and other organisms are able to grow in the presence of high concentrations of these compounds without being significantly affected by them.

Nearly all mice infected with tubercle bacilli, either intranasally or intravenously, will be dead

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Superior activity of the new over the old anti-tuberculous agents is shown in the demonstration of the relative volumes of nutrient medium in which growth of tubercle bacilli can be inhibited. Equal weights (0.2 mg.) of PAS, streptomycin and isonicotinic acid hydrazide will inhibit growth of Mycobacterium tuberculosis (BCG) in one cc., 400 cc., 22 liters, respectively of nutrient. The crystal under the magnifying glass is 0.2 mg. of isonicotinic acid hydrazide.

SQUIBB PHOTO

within 21 days from widespread tuberculosis if no treatment is given them. The very few that do survive longer are ill and will be found to have the changes in the lungs and other organs compatible with extensive, active tuberculosis when they are examined after being sacrificed. Grunberg and Schnitzer,¹ similarly infected a rather large number of mice and then treated them with these new drugs for 21 days in doses varying from 3 to 25 mg./Kg./day. Not only did from 60 to 100 percent of the mice live throughout this period, but after they were killed no disease was present and no cultures of live bacteria could be obtained in most of the animals.

Zieper and Lewis² likewise found, after treating for two and a half months a *Macacus rhesus* monkey which had developed clinical tuberculosis, that although pathological changes were present, indicating that tubercle bacilli had been present, no active disease could be found. They also were unable to culture any organisms from the lungs, liver, or other tissues of this animal.

These observations, if confirmed, are not only important because of the arresting or prevention of tuberculosis but they become of special significance when it is realized that the tubercle bacilli could not be cultured from these tissues. Using previous forms of therapy, tuberculosis could sometimes be arrested, but live organisms remained in the tissues which could re-infect the animal if the situation became favorable for the bacteria. In other words, these new drugs are the first which have been found that could rid the body of tubercle bacilli completely without themselves causing severe damage to the animals.

PHARMACOLOGY AND TOXICITY

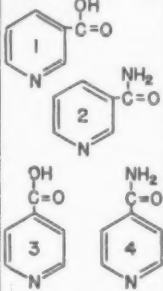
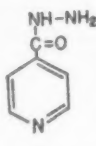
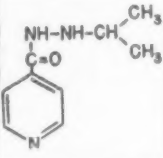
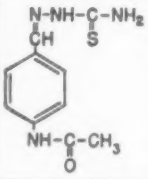
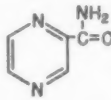
With any new drug it is important to discover the available routes of administration, the distribution of it in the tissues and body fluids, the manner of excretion from the body, as well as its toxic effects on patients to whom it is given. The isopropyl and hydrazine derivatives of isonicotinic acid can be given orally or parenterally. Within an hour after their oral administration high concentrations are found in all body fluids including the cerebrospinal fluid. This indicates that the absorption from the intestinal tract is both prompt and adequate in amount. The parenteral, i. e. intramuscular or intravenous, route is not as convenient and local muscle soreness and inflammation have followed its use. It is possible, however, to give these drugs in this manner if the patients can not take them orally.

The excretion of these drugs is primarily by way of the kidneys but an appreciable amount does appear in the stools, tears, and saliva as well.

At present the daily dosages vary between 3 and 5 mg./Kg. and this is divided into three or four equal amounts. Some of the patients, treated at first, were given as much as 10 mg./Kg./day. The incidence of toxic manifestations increased sufficiently, however, to deem it inadvisable to use this amount routinely. Scored tablets containing 100 mg. of the drug are available.

In man and animals the toxic symptoms have been of the acute type.³ That is to say that they appeared as symptoms rather than as permanent functional or structural changes in the liver, kidneys, or other organs. They became evident after two to five weeks of treatment and were not

ISONICOTINIC ACID DERIVATIVES
AND RELATED COMPOUNDS

CHEMICAL	STRUCTURE	TRADE NAME & MANUFACTURER
Nicotinic acid (1) and Nicotinic Acid amide (2) Isonicotinic acid (3) and Isonicotinic acid amide (4)		Basic compounds ineffective as antitubercular drugs but illus- trating structural relationships to the new compounds.
Isonicotinic acid hydrazide		Cotinazin-Pfizer Dinacrin-Winthrop Stearns Ditubin-Schering Nydrasid-Squibb Rimifon-Hoff- mann-La Roche
1-Isonicotinyl-2- isopropylhydrazine		Marsilid-Hoff- mann-La Roche
p-Acetylaminoben- zal-thiosemicarb- ozone.		Tibione-Schenley (not discussed in this paper)
Pyrazine-carboxylic acid amide		Aldinamide- Lederle (not discussed in this paper)

sufficiently severe to require the discontinuation of treatment. Not infrequently, despite continuation of the drug, these toxic symptoms would entirely disappear in a few days. The toxic manifestations listed in the approximate order of their frequency are: vertigo (dizziness), muscular twitching and increased reflexes, weakness of the legs, difficulty in urination (especially troublesome in male patients), constipation, drowsiness, headache, disturbed vision, dryness of the mouth and tinnitus (ringing of the ears). There have been no cases as yet of deafness, impaired liver or kidney function, nor severe rashes which were found to be present in patients treated with streptomycin.

One of the most troublesome problems in streptomycin therapy has been the ability of the tubercle bacilli to become resistant to it. At present no studies in man or animals are completed which

might indicate the chances of the bacteria becoming similarly resistant to these isonicotinic acid derivatives. One particular strain of modified tubercle bacilli (B. C. G.) was made resistant in extensive laboratory tests to one of these drugs. It is therefore possible that this same problem may again become troublesome.

CLINICAL RESULTS

Up to the present time approximately 200 to 300 patients have been given some form of isonicotinic acid in this country. The first patients⁴ were started at Sea View Hospital in New York on June 19, 1951. Additional ones were added to this series in October, November, and December of 1951. Aside from these, a few more have been rather extensively studied by Dr. Walsh McDermott⁵ and his group in New York Hospital, and a few cases of meningeal and miliary tuberculosis are under the care of Dr. Charles Clark at the Western Navajo Hospital, Tuba City, Arizona.⁵ Since there are so few reports available they will all be discussed together.

It must be remembered that the patients who were chosen to receive these investigational drugs first were, by and large, suffering from far advanced tuberculosis. They had either failed to respond to conventional forms of treatment or they were in such condition that other therapy could not be used. In most cases extensive and permanent changes had already taken place especially in the lungs, which could not be expected to show improvement to x-ray evaluation even if all the live bacteria were killed. It is, therefore, entirely possible that better results may be obtained when the same preparations are used in less advanced disease, and when they are combined with other forms of treatment.

Temperature. Most of the patients treated were febrile prior to receiving one of these drugs. Practically all had a return to normal temperatures within two weeks and many had returned to normal in 24 to 48 hours. This fall in temperature was not just a temporary change. Aside from slight rises with colds or other minor infections, these patients have remained afebrile for as long as six months.

General Condition of the Patients. Practically all of the patients treated so far were weak, easily fatigued, apathetic, short of breath and had lost their appetites before therapy. These symptoms were found to change abruptly within a few hours or days in nearly everyone. It was not uncommon for them to start asking for second and third helpings of food. Many began to get out of bed and walk around the wards whereas all had been previously bedfast, a few even for

as long as two years. Every patient at Sea View Hospital began to gain weight. Increases of three to five pounds per week were not uncommon and some gained as much as forty to fifty pounds. It was feared at first that this weight gain might represent retention of fluid and electrolytes, but this has not been borne out by further observation. Only a few patients developed slight ankle edema and it is now felt that the weight gain actually represents increase of body tissues.

Coughing and expectoration have decreased or become absent in practically every person. When some cough and sputum persisted it was characterized by a thin watery material rather than the thick, sticky, purulent type which had been present before. Although few results are available on the cultures of this sputum, those that have been reported show that there is either complete absence of tubercle bacilli or at least marked reduction in their frequency. Many more studies are necessary to confirm this early impression.

X-ray Appearance. As was previously mentioned, it is not surprising that there has been no striking improvement in x-rays of these patients. This is only in part due to the fact that they represent some of the most advanced types of tuberculosis. Despite the rapidity of the healing of tuberculosis, the changes in the x-rays are gradual and it frequently takes a matter of months before definite changes take place. Since these drugs have only been used a short time, only minor improvement could be expected and further improvement can undoubtedly be anticipated in the near future. The changes noted to date have consisted of resorption or disappearance of some of the non-cavitary areas of disease as well as definite decrease in many and closure of at least one definite cavity.

Non-pulmonary Tuberculosis. Tuberculosis frequently involves other areas of the body such as the trachea, intestinal and urinary tracts, bones, and central nervous system. At the present it can be said that of these sinuses in the skin, trachea, bone, intestinal and probably urinary tract tuberculosis have shown definite improvement and, in some, complete healing during treatment with these drugs. A few cases of meningeal and miliary tuberculosis have not been treated sufficiently long to draw any conclusions.

DISCUSSION

With the introduction of any new drug into the treatment of disease, many more questions are raised than are settled until after a great deal of work has been done. The mode of action, i.e., bacteriostatic or bactericidal, toxicity to the patient, optimal dosage, and duration of therapy

are but a few of the questions that can be raised. The effectiveness of this therapy as far as the patient's course is concerned is of utmost importance. For example, it is possible, though unlikely, that the feeling of well being, temperature fall, weight gain, and even decrease in sputum could be the results of an endocrine, possible cortisone or ACTH, like action of these drugs. This would be entirely different than the more likely direct action of these new preparations against the tubercle bacillus itself.

The results to date appear to be very encouraging. The subjective improvement, decreased sputum, and early x-ray changes have been nearly uniformly present. It must, however, be realized that the introduction of any new form of treatment, especially in a chronic disease like tuberculosis, is apt to be accompanied by an unwarranted burst of enthusiasm before a critical appraisal of the results can be made. It is with great interest that we must await the gradual accumulation of data from careful studies of toxicity, resistance, laboratory tests, and clinical evaluation of patient improvement, before accepting these as revolutionary drugs. For the present, the treatment of the vast majority of tuberculous patients should and will remain to be bed-rest, collapse therapy, streptomycin and *para*-aminosalicylic acid, and various types of surgery.

SUMMARY

It is our feeling that the hydrazide and isopropyl derivatives of isonicotinic acid have been shown, by preliminary reports, to exert a rather specific and marked action against cultures of tuberculosis and in experimentally induced tuberculosis in animals. In man, incomplete preliminary studies tend to support the view that these drugs also may exert a favorable influence upon the course of clinical tuberculosis.

The questions of mode of action, toxicity, and the development of resistance have remained unanswered.

REFERENCES

1. Grunberg, E. and Schnitzer, R. J., *et al*: Studies on the Activity of Hydrazine Derivatives of Isonicotinic Acid in the Experimental Tuberculosis of Mice, *Quart. Bull., Sea View Hosp.* 13:3 (Jan.), 1952.
2. Zieper, I. and Lewis, R.A.: Tuberculosis in a Macacus rhesus treated with Isonicotinylhydrazine, *ibid* 13:12.
3. Selikoff, I. J. *et al*: Toxicity of Hydrazine Derivatives of Isonicotinic Acid in the Chemotherapy of Human Tuberculosis, *ibid* 13:17.
4. Robitzek, E. H. *et al*: Chemotherapy of Human Tuberculosis with Hydrazine Derivatives of Isonicotinic Acid. Preliminary report of (6) representative cases, *ibid* 13:27.
5. Press Conference, National Tuberculosis Association, February 21, 1952, New York City.

The Business Side of Hospital Pharmacy

by GEORGE F. ARCHAMBAULT

SEVERAL years ago. Dr. George D. Wolf, a fellow of the New York Academy of Medicine and of the American Medical Association, wrote a text entitled "The Physician's Business."

This text sought to point out to the practicing physician that his medical practice involved two things:

- (1) Competency as a physician—and
- (2) Competency as a businessman.

The text dwelt almost exclusively with matters concerned with the physician as a businessman. The problems of selecting a hospital internship, medical careers other than private practice, specialization, location of office, professional contacts, planning and equipping the office, and patient relationship, office personnel, office practices and policies, surgical instruments, forensic medicine, taxes, insurance, and other business and legal problems are discussed in detail in this book prepared for physicians.

Chiefs of Pharmaceutical Services in hospitals and clinics must also recognize that they too, like the practicing physician, operate in a dual capacity of professional and businessman. In addition to serving as the drug therapy consultant to the staff and being responsible for the practice of pharmacy at the institution in which they serve, hospital pharmacist department heads are expected to be capable departmental business managers.

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The business of hospitals is listed today as big business. It is said to rank as the sixth largest industry in the country. In addition, the business of hospitals operates in most instances on a non-profit basis, with funds received from taxpayers and contributors. Hospital pharmacists therefore have, like hospital administrators, not only the responsibilities attached to the operating of a profit making business, but also the added responsibilities of serving the community in a position of public trust where they administer public funds for the care of the sick of the community.

To properly serve as the entrepreneur or manager of a hospital pharmacy, the tools of management, which I call the three "M's" must be understood by and available to the chief of the Pharmaceutical Service: — I refer to Men, Money and Management.

MEN

Proper man power in terms of quantity and quality is necessary in operating any type of service. Sound personnel practice requires that the Personnel Office recruit for specific vacancies, screen out those applicants who manifestly do not meet the requirements of the proposed position, and refer when available, no less than three qualified applicants to the department head, for interview, discussion of the work and final selection. In referring these applicants, it is the responsibility of the Personnel Office to make whatever pertinent recommendations that may be indicated to guide the department head in making his selection. The department itself then makes the final selection based on such factors as abil-

PHARMACY PERSONNEL

staffing pattern¹

	50	B E D 100	C A P A C I T Y ² 200	500	750	1000
CHIEF	1 ³	1	1	1	1	1
ASSISTANT CHIEF	0	0	1	1	1	2
STAFF PHARMACIST	0	0	0	1	2	1
INTERN	0	0	1	2	2	3
SECRETARY-STENOGRAPHER	0	0	0	1	1	1
PHARMACY HELPER--STOCK CONTROL CLERK	0	0	0	1	1	1
CASHIER ⁴	0	0	0	1	1	1
PHARMACY HELPER	0	1	1	1	2	2

¹ Based on outpatient activity of approximately 70 prescriptions daily.

² Add 1 additional pharmacist for each additional 70 individual outpatient prescriptions dispensed daily above basic 70.

³ Assumes 1 or more additional areas of duty—X-ray technician, laboratory technician, purchase and supply activities, or general administrative activity.

⁴ If outpatient activity and hospital policy indicates.

Based upon normal workloads, including the following factors:

- Compounding and dispensing of individual outpatient prescriptions.
- Ward and clinic (basket) issues.
- Hospital-manufactured pharmaceuticals.
- Time consumed in individual consultations with medical, dental, and other staff members on drug therapy problems.
- Teaching schedules—medical, dental interns, and nursing school.
- Preparation of extemporaneous sterile parenteral and surgical solutions of narcotics, antibiotics and others.
- Requisitioning and/or purchasing of supplies.
- Maintenance of perpetual inventories.
- Preparation of reports, monthly, annual, on stock control of inventories, drug costs, workloads.
- Attendance at and participation in staff, pharmacy committee, and other meetings.
- Indoctrination and training of department personnel.

ity of candidate to work with the present personnel and his degree of efficiency. This should be standard procedure for all hiring activities of hospital pharmacy personnel.

STAFFING PATTERN

What constitutes adequate staffing for hospital pharmacy is, to the best of my knowledge, as yet undefined. I present for your consideration

in this respect, a general hospital bed breakdown to give you at least a rule of thumb, guidance in the matter. Obviously, hospital pharmacies engaged in *full* pharmaceutical services including parenteral solutions, surgical fluids, allergy preparations, pharmaceutical manufacturing, patient billing, and a separate purchasing unit require more personnel than those pharmacies that operate with lesser coverage.

MONEY

A well operated hospital pharmacy should have its own annual budget. If this budget is allotted to the department in quarterly amounts based on usage rates and other factors such as drug therapy and staff changes, an efficient and sensible procurement and inventory policy can result. A quarterly conference on drug budget analysis between the administrator and the chief of the Pharmaceutical Service, utilizing the drug and usage rate records, provides an excellent medium for a proper understanding by both parties of the problems involved. The efficient hospital administrator seeks such conferences with his department heads.

MANAGEMENT

The last of the three "M's", and one of the most important, is management. By "Management" I refer to the ability of the department head to combine the factors of men and money, time and "tools" to produce an efficient, economical end product, in this instance, a good pharmaceutical service.

No department head can expect to perform this feat without the management tools of responsibility and accountability. In this respect let us look for a moment at the tools of management, other than men and money, that are needed for sound hospital pharmacy administration—I refer to:

1. Inventory policy
 - A. Storage
 - B. Perpetual Inventory Records
2. Monthly and Annual Reports

I. INVENTORY POLICY

The first point that is usually considered in discussing inventories is one of location. Where should the bulk drug inventory other than actual use items be stored? What is the best storage place for pharmacy supplies, in a general storeroom or in a separate storeroom attached to and part of the pharmacy?

Management experts all agree that in general, a common or central storeroom is ideal. Inventory is controlled and labor and record keeping lessened by such a procedure. However, all well-founded rules seem to have exceptions and pharmacy is the exception in this case—there is no question but what pharmacy should have, in the interest of economy and efficiency, a separate pharmacy storeroom under the complete control of the Pharmacy Department and in close proximity to it.*

*Survey of Hospital Pharmacies, *Am. Profess. Pharm.* 14:356 (April) 1948.

This policy was adopted in 1949, by the Public Health Service, Division of Hospitals, and is in use today. It is one of maintaining pharmacy stores in a separate area under the jurisdiction of the pharmacist who has requisitioning authority, reviewable only by the medical officer in charge or clinical director. This basic policy is similar to the one in use at 83.5 percent (5 out of 6) of the hospitals of the nation as indicated in a survey of 338 representative hospitals.

In arriving at the policy that drug supplies should be stored in *separate* pharmacy storerooms under the jurisdiction of a pharmacist as against any dichotomous arrangement involving general supplies, an analysis was made of the factors of public health and safety as well as those of efficiency and economy. A few of these fundamental factors are:

1. Responsibility for storage of drugs, many of which deteriorate by improper storage, is placed upon individuals who by their education and training are best qualified to assume this responsibility;
2. Rapid changes in drug therapy trends and the transfers of physicians and dentists are immediately known to the pharmacist. Such information is not usually common to other individuals involved with supplies. This information is necessary in properly determining re-order amounts and/or the addition and deletion of items in the drug inventory;
3. Such a system of operation gives immediate availability and knowledge of supplies to the department having the sole authority to use the stock—the Pharmacy Department. This insures more efficient service and lowers the amount of capital invested in drug supplies as contrasted with the required amount of investment in any other system. It also couples with the responsibility of maintenance of vital drug inventories, the necessary management companion, accountability.
4. Stock control and inventory cost records being made by pharmacy personnel at or close to the time of the action avoids lengthy delays in posting and in preparing requisitions, as well as avoids duplication of effort.

The basic pattern as adopted by the Division of Hospitals of the Public Health Service for the control of drug supplies and stores follows closely principles laid down by Malcolm T. McEachern, M. D., former associate director of the American College of Surgeons. Dr. McEachern, in his text on "*Hospital Organization and Management*,"

states "... in selecting a location it must not be forgotten that ample space is required for bulk storage and that this storeroom (*pharmacy*) is preferably located on the ground floor *close to the pharmacy*, and "... that the purchase of drugs and pharmaceuticals is a specialty which can be carried out to the best advantage by a pharmacist trained in managing a hospital pharmacy" and again, "This is the only department in the hospital in which it is usually *not* advisable to have purchasing done by a general purchasing agent." The system adopted by the Service gives requisitioning authority to the pharmacist but retains the actual purchasing activity or machinery in the usual Purchasing Department channels.

II. STOREROOM ARRANGEMENT AND DATING OF STOCK

Next for consideration, is how best to arrange stock in the storeroom. In this connection I believe you will be interested in a directive released in early 1949 by the Division of Hospitals to its pharmacists. This directive is as follows:
Subject: Dating of Drug Stocks as Received and Arrangement of Drug Stocks in Pharmacy Stores

Dating of Stocks

Sound business management indicates that the money invested in drug supplies be turned over approximately four times yearly. Normally, a stock turn of less than four indicates an over-inventory.

Therefore, as the first step in a program of sound inventory control, all pharmacies shall, effective February first, mark or stamp all expendable drug items when received into stores, with the month and year of receipt. For example, an item received on February 15 shall be marked or stamped in small print: "2/49"

All items without a date mark will be presumed to have been in stock prior to February 1, 1949.

The introduction of such dating system should insure the use of old stocks first and make more noticeable over-buying in certain areas.

Drug Stock Arrangement

Drug supplies maintained as stores (not expended to the Pharmacy proper, but kept in the pharmacy storeroom) shall be arranged in simple alphabetical order with five exceptions.

a. *Gallonage*: Gallon containers should be arranged alphabetically in a separate section or stored on bottom shelves. An alphabetical arrangement should be maintained;

b. *Perishables*: Perishables such as biologicals, antibiotics, and others should be stored in properly refrigerated units;

c. *Narcotics*: Narcotics are to be stored in properly locked containers, which satisfy the regulations of the Service and the Harrison Narcotic Act;

d. *Alcohol, Spirituous Liquors and Wines*: Alcohol, spirituous liquors and wine should be stored in properly locked, fireproof cabinets that meet the requirements of the Service, Federal and local laws including fire regulations;

e. *Large Bulk Items*: Liter parenterals, plasma, gases and others.

Install "Shelf-Stripping"—This consists of applying adhesive tape, capable of carrying writing, to the upper front edge of the shelves. The information and rulings on the tape indicate the "home" of each particular item. Each item is allotted a definite width of the shelf for its accommodation.

Example:

1-010-005 Acetylsalicylic Acid tablets 325 mg. (4) 5000	1-015-525 Acid Fuschin (1) 10 Gm.	1-046-000 Agar (2) LB.
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Information on the tape will give the name (Acetylsalicylic acid tablets), strength, if any (325 mg.), unit (5000) and stock number (1-010-005) of the item stored in the particular area as well as the minimum level (4) or re-order point. "Shelf-stripping" besides providing a double check against shortages, insures a definite width of space on the shelf as the "home" for the item. The item is set directly back of the tape in the space designated. The markings on the tape may be erased and changed several times before a new tape is required.

III. PERPETUAL INVENTORY RECORDS

With drug stock systematically arranged in a pharmacy storeroom, the task of setting up and maintaining a perpetual inventory system becomes fairly simple. For this purpose a visible Kardex or similar type drawer file appears to be the ideal solution.

A sample card in use on an active item is available for your inspection as an example of the type of system used in Public Health Service Hospitals. This system provides a standard method of controlling stock levels, insuring availability of supplies, reporting of drug usage rates, and a monthly inventory value on each item stocked. Inasmuch as current statistics indicate that 15 to 30 percent of every supply dollar at a hospital goes into drug purchases, the value of sound records in the pharmacy department cannot be underestimated.

Public Health Service policy of operating the pharmacy storeroom stock control system is as follows:

1. The chief pharmacist places the total responsibility of posting to the cards and the accuracy of the stock records including the accuracy of inventory and the correction of extensions on one individual, usually a competent pharmacy helper. That individual is given the *sole* responsibility for drug receipts, withdrawals, perpetual inventory records and storeroom arrangement in addition to his other duties. In practice, it has been found that where the pharmacy helper has been properly selected and trained, (in many instances, he has attended a school of pharmacy for 1 or 2 years), he is well qualified to assume this responsibility. Obviously, in one-man pharmacies, this responsibility must rest upon the pharmacist himself;
2. The individual made responsible for the periodic checking of physical stocks against the perpetual inventory records is instructed to check items in at least two letters of the alphabet weekly, i. e., A. and B. items one week, C. and

D. items the next week and so on. Neat stock arrangement, clean dust-free storeroom and accurate unit and extension cost records in the perpetual inventory usually result when such a check system is employed. Further, such a check system gives annually, four complete physical checks of supplies against records plus the usual official physical inventory taken at the close of the fiscal period each June;

3. At many stations it has been found convenient to locate the stock control records just inside the entrance of the pharmacy storeroom where postings of in and out-flow of stock may be made at the time of the action;

4. It is essential in order that the system work effectively that the hospital issue an order directing the individual in charge of the hospital at odd hours to *log all entrances into the pharmacy* and/or pharmacy storeroom at times other than when a pharmacist is on duty and further that any emergency withdrawals of supplies made from the Pharmacy or pharmacy storeroom be made the subject of a memorandum, to be left at a designated place in the Pharmacy at the time of the withdrawal;

5. Purchase requests for supplies are prepared usually when the minimum or re-order point is reached on the stock control cards; however, in determining re-order amounts and/or the addition and deletion of items from the drug inventory such factors as drug therapy trends and changes in medical and dental staff must also be taken into consideration. Purchase requests for supplies are, except in emergencies, submitted to the Purchasing Department by the Pharmacy Department on one designated day of each week. Purchase requests are dated and prepared in duplicate with the carbon retained in a "requisitions pending file" in the Pharmacy. Copies of purchase orders issued for pharmacy supplies by the hospital are routed to the Pharmacy where they are stapled to copies of the requisitions. This material is kept in an "orders pending file" until receipt of the stock at which time it is filed for the duration of the fiscal year in the contractor's folder on file in the Pharmacy.

It will be noted that items expended from the Storeroom to the Pharmacy proper are not included in the inventory value. The value of such items may be kept at a constant figure for a 12 month period, when a new physical inventory provides the adjustment factor. While it is admitted that this is not an accurate inventory figure, for 11 months out of the 12, it is correct as of the last month of each fiscal year and does not impose the cost of an expensive physical inventory of open stock each month.



Solicit Membership

Support Affiliated Chapters

Attend Annual Conventions

*Promote Better Hospital
Pharmacy Practice*

*Participate in
National Organizations*

Stock No. 1-058-905

ORDERED

RP 23443

COST

RECEIVED

7	8	9	10	11	12	13	14	15
DATE	QUANT.	ORDER No.	VEN.	UNIT	TOTAL	DATE	QUANT.	BAL DUE
1950								
11/9	24	6.17	1	.20	4.80	11/28	24	
11/30		Value					4.80	
1951								
2/1	144	6.18	1	.17	24.48	2/20	144	
2/28		Value					24.48	
4/27	8	6.4	1	.27	2.16	7/13	8	
7/31		Value					2.16	

Stock No. 1-058-905

16. VENDOR

SUPPLY STATION, PERRY POINT, MD.

AMOUNT TO ORDER

17. MONTHLY CONSUMPTION

RP 23444

	19	51	19	19	19	19	19
JAN							
FEB	144						
MAR							
APR							
MAY	8						
JUN							
JUL							
AUG							
SEP							
OCT							
NOV							
DEC							
TOTAL							

18. MEMO.

ALUMINUM HYDROXIDE GEL, DRIED TABLETS, 0.324 Gm., (5 gr.), 100s

FORM NO-1A

PURCHASE CARD

FORM NO-1B

EXPERIENCE CARD

Stock No. 1-058-905

REFERENCE	REC'D	ISSUED	BAL.	REFERENCE	REC'D	ISSUED	BAL.	REFERENCE	REC'D	ISSUED	BAL.
1	2	3	4	5	6	1	2	3	4	5	6
DATE	RECORD No.	QUANT.	QUANT.	DEPT	QUANT.	DATE	RECORD No.	QUANT.	QUANT.	DEPT	QUANT.
1950											
11/28	6.17	24			24						
11/28			24		0						
11/30	Value			0							
1951											
2/20	6.18	144			144						
2/28	Value				24.48						
3/30			12		132						
3/30	Value				22.44						
6/13			36		96						
6/30	Value				15.98						
7/10			12		84						
7/13	6.4	8			92						
7/31	Value				25.34						

A MINIMUM OR ORDER POINT

C ISSUE PRICE

D UNIT

E DATE DISCONTINUED

F REPLACED BY STOCK NO.

STOCK NO

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

ORDERED

REQ'D

OUT

MONTHS SUPPLY

1-058-905

ALUMINUM HYDROXIDE GEL, DRIED TABLETS, 0.324 Gm., (5 gr.), 100s

4 6 8 10 12

PART IV

INVENTORY STATUS

DESCRIPTION FIGURES FOR ITEMS 2 AND 4 TO BE TAKEN FROM PHARMACY STOREROOM STOCK CONTROL RECORDS. (A)	PHARMACY SUPPLIES - DOLLAR VALUE			
	SPECIAL - ITEM A ANTIBIOTICS	SPECIAL - ITEM B	ALL OTHER PHARMACY SUPPLIES	TOTAL ALL ITEMS
	(B)	(C)	(D)	(E)
1. Beginning Inventory (First of each month)	\$	\$	\$	\$
2. Purchases Received (During month)				
3. Available Inventory (Items 1 & 2)				
4. Closing Inventory (End of month)				
5. Supplies Issued (During month - items 3-4)				
6. Remarks				

PART V

UNIT VALUE - INVENTORY PER ACTIVE BED

1. Value of Closing Inventory, Pharmacy Stores (Part IV, line 4, Column "e")	\$
2. Average Daily Inpatient Load. Last 12 months (To be supplied by Records Office)	
3. INVENTORY VALUE Per Active Bed (Item 1 divided by Item 2)	\$

PART VI

UNIT VALUE - DRUGS ISSUED
(Use Section A or B below)

A. FOR OUTPATIENT CLINICS ONLY

1. Value of Drugs Issued During Month (Part IV, line 5 Column "e")	\$
2. Number of Outpatient Visits During Month (To be supplied by Records Office)	
3. Average Value Per Outpatient Visit (Item 1 divided by Item 2)	\$

B. FOR HOSPITALS ONLY

4. Value of Drugs Issued During Month (Part IV, line 5, Column "e")	\$	100%
5. Estimated Cost Per Outpatient Visit (January or July costs) (Cost of all medications issued for outpatient purposes divided by number of outpatient visits, to be computed by Chief Pharmacist each Jan. and July.)		
6. Number of Outpatient Visits During Month (To be supplied by Records Office)		
7. Estimated Value of Outpatient Medications (Item 5 times Item 6)		%
8. Estimated Value of Inpatient Medications (Item 4 minus Item 7)		%
9. Number of Inpatient Days During Month (To be supplied by Records Office)		
10. Average Cost of Inpatient Medications Per Inpatient Day (Item 8 divided by Item 9)	\$	

PART VII

ISSUES TO SELECTED SERVICE

1. Value of Ward Issues To _____ Service During Month	\$
2. Number of Inpatient Days for _____ Service During Month (To be supplied by Record Office)	
3. Average Cost of Medications Per Patient Day (Item 1 divided by Item 2)	\$

◀ To the left is the form used by Public Health Service pharmacies to report inventory status and value of drugs issued.

▶ To the right is the form used to request the purchase of a non-basic drug.

PHARMACY COMMITTEE AND FORMULARY

In an attempt to operate as efficiently and economically as possible, hospital pharmacists should give consideration to the establishment of two other management tools of sound hospital pharmacy administration.

1. A Pharmacy Committee
2. A Basic Drug Handbook or Formulary

Our concept of the workings of these two tools is one where the Basic Drug Index or Handbook, as prepared by the Pharmacy Committee, serves as the guide to the staff as to what is to be stocked in the Pharmacy. The Pharmacy Committee has as one of its functions, the approval or rejection of requests for new items. A sample of a request form used by the Service for this purpose is available for your inspection.

This system gives a degree of protection to the standardization of "house stock." Admittedly, private patients make the problem of maintaining low unit inventories more difficult, but this problem can usually be fairly well solved in civilian hospitals by good relationships between the individual physician and the chief of the pharmaceutical service.

One thing I wish to especially stress in connection with inventory control activity is that the introduction of such a system must not, in any sense, be construed as denying to the medical and dental staff their professional right to determine the choice and extent of drug therapy to be employed in patient care. Such is not the function of any ancillary service of the hospital. The medical and dental staff, through the orderly process, as set up for the operation of the Pharmacy Committee continues to exercise the exclusive right of determining what drug therapeutic agents shall be employed in patient care, as well as the extent of such usage.

We have discussed in this "business of hospital pharmacy," pharmacy storerooms, arrangement of stocks, perpetual inventories, the value of Basic Drug Handbook and some of the functions of a Pharmacy Committee. All of these have an impact on two of the most important reports that the chief of a Pharmaceutical Service produces, the monthly and annual reports.

FEDERAL SECURITY AGENCY PUBLIC HEALTH SERVICE

Date _____

To: Pharmacy Committee
Thru: Chief Pharmacist
Subject: Request for Purchase of Non-basic Drug

NAME OF DRUG _____

MANUFACTURER _____

DOSAGE FORM(S) WANTED (CHECK)

* TABLET () CAPSULE () LIQUID () OINTMENT ()

POWDER () AMPUL () OTHER (SPECIFY) _____

MINIMUM SUPPLY REQUESTED _____

ROUTINE () EMERGENCY ()

NAME OF PATIENT OR SERVICE FOR WHOM DRUG IS REQUIRED _____

DESCRIBE PHARMACOLOGICAL ACTION NEEDED _____

IS THERE A SIMILAR-ACTING DRUG STOCKED IN THE PHARMACY WHICH MAY BE USED? YES () NO ()

IF YES, WHAT ADVANTAGE DOES THIS DRUG HAVE? _____

REMARKS: _____

/S/ _____
Medical or Dental Officer
Requesting

APPROVED: _____
Chief of Service

APPROVED: _____
PHARMACY COMMITTEE

PHARMACEUTICAL SERVICE REPORT ON DRUG

AVAILABILITY OF DRUG _____

INDICATE IF DRUG REQUESTED IS RECOGNIZED BY U.S.P., N.F., N.N.R., OR

A.D.R. _____

COST OF DRUG _____

COST OF SIMILAR-ACTING ITEM STOCKED _____

REMARKS _____

/S/ _____
Chief, Pharmaceutical Service

												MONTH OF _____					
(A) DAY OF MONTH	PRESCRIPTIONS AND REQUISITIONS										(G) WARD AND CLINIC ISSUES		(H) MANUFACTURED ITEMS		(I) TOTALS		
	(B) ETHYL ALCOHOL		(C) NARCOTIC		(D) HYPNOTIC		(E) REGULAR PRESCRIPTIONS		(F) SUB-TOTAL		IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT	
	IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT	IN- PATIENT	OUT- PATIENT							
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	

2. MONTHLY AND ANNUAL REPORT

Chiefs of Pharmaceutical Services should consider it their responsibility to provide their institution with a monthly and yearly yardstick with which to measure departmental activity and progress.

This report is one of the major tools of management, through it a department head documents his needs for a larger or smaller budget, for increased or decreased personnel, for equipment and other needs.

The Pharmacy Branch of the Division of Hospitals has adopted a combination professional-business type report, a sample of which has been made available to each of you. Note that the monthly professional workload factors are broken out into inpatient and outpatient classifications. Note also that the workload is broken into various categories such as those requiring special accounting as made necessary by Federal and State laws, such as narcotics and liquor, and those categories not entailing such extra man-hours of bookkeeping.

In brief, the workload or volume of the Pharmacy is presented as a report of specific areas of major activity. Each prescription, requisition, issue to a ward or clinic, and each manufactured item and item prepackaged for outpatient offices (for use in other cities) is tabulated.

Note that space is provided in the monthly workload report for reporting Pharmacy Committee meetings and their activities, as well as space for remarks on Pharmacy activities of the month, such as clinical-pharmaceutical research,

new equipment received, papers prepared for publication, drug therapy consultatnt activities, and other matters.

Finally, space is provided for noting the number of group meetings, both intramural and extramural.

I like to refer to this part of the report as the "non-measurable Workload Section." As hospital pharmacists, we all know that considerable time is devoted to such items as individual consultations on drug therapy problems with medical, dental, and allied personnel; hospital pharmacy indoctrination and teaching schedules for medical and dental interns, nurses, and hospital aids; also many man-hours are consumed in the daily preparation of extemporaneous sterile parenteral preparations of antibiotics, narcotics, and surgical fluids; the requisitioning or purchasing of supplies, the keeping of perpetual narcotic, hypnotic, grain alcohol and spirituous liquor inventories; the

▲ Above, at top of page. Daily Pharmacy worksheet showing the breakdown of items for inpatients and outpatients.

▶ To the right, a monthly report form showing a summary of Pharmacy operation.

PHS-1310(HD)
REV. 4-51

PHARMACY OPERATIONS
MONTHLY REPORT

DISTRIBUTION OF COPIES
1 - Div. of Hospitals, c/o Pharmacy Branch
1 - Medical Officer in Charge
1 - Pharmacy
1 - Medical Record Office
1 - Fiscal Office

NAME OF REPORTING STATION	LOCATION	REPORT FOR (MONTH AND YEAR)
---------------------------	----------	-----------------------------

PART I PHARMACEUTICAL ACTIVITIES

DESCRIPTION	NUMBER OF ITEMS		
	INPAT.	OUTPAT.	TOTAL
1. Prescriptions and Requisitions			
(a) Ethyl alcohol, spirituous liquors and wines			
(b) Narcotics			
(c) Hypnotics			
(d) Regular			
(e) Total Prescriptions and Requisitions			
2. Issues to Wards and Clinics			
3. Manufactured Items (<i>Considered as in-patient activity in Hospitals</i>)			
4. Items Prepackaged for Outpatient Offices			
5. Total Number of Items (<i>Items 1 e plus 2, plus 3, plus 4</i>)			

PART II COMMENTS

1. (a) Was a Pharmacy Committee meeting held during the month? ☐ Yes ☐ No
 Comments on meeting:
- (b) Remarks on pharmacy activities during the month: (Research, formula development, significant changes in inventory and work load, new equipment received, papers prepared for publication, inquiries.)
2. (a) Number of group conferences held (1) intramural_____ (2) extramural_____

PART III PERSONNEL

POSITIONS	NUMBER OF PERSONNEL				
	TOTAL PERSONNEL	CIVIL SERVICE	COMMISSIONED OFFICERS		
			TOTAL	REGULAR	RESERVE
1. Pharmacist					
2. Pharmacy Helper					
3. Other (<i>Itemize in item 5 below</i>)					
4. Total					

5. Indicate Number of 'Other' Personnel (*Item 3*) by Position and Grade

POSITION	GRADE	NUMBER

6. Other Duties (*Indicate percent of time spent on other duties by pharmacy personnel and nature of such duties*)

POSITION	PERCENT	TYPE OF DUTY

PREPARED BY (CHIEF PHARMACIST)	DATE PREPARED	APPROVED BY (MEDICAL OFFICER IN CHARGE)
--------------------------------	---------------	---

F.Y. 19	(PART I) WORKLOAD										PART II		(PART III) PERSONNEL				
	PRESCRIPTIONS & REQUISITIONS					WARD & CLINIC ISSUES	MFD. ITEMS	TOTAL	PHARMACY MEETING		PHARM HELP	OTHERS TOTAL	OTHER ACTIVITIES	MAN YEARS			
	ALCOH.	NAR.	BARB.	REG.	TOTAL				YES	NO							
															COM.	C.S.	TOTAL
JULY																	
AUG.																	
SEPT.																	
OCT.																	
NOV.																	
DEC.																	
TOTAL																	

PART IV INVENTORY STATUS

F.Y. 19	PURCHASES RECEIVED										CLOSING INVENTORY				VALUE OF ISSUES			
	TOTAL					TOTAL					TOTAL				TOTAL			
	PENIC.	STREP.	OTHER			PENIC.	STREP.	OTHER			PENIC.	STREP.	OTHER		PENIC.	STREP.	OTHER	TOTAL
JULY																		
AUG.																		
SEPT.																		
OCT.																		
NOV.																		
DEC.																		
TOTAL																		

F.Y. 19	PART V										(PART VI) UNIT VALUE - DRUGS ISSUED										(PART VII) ISSUES TO SEL. SERV.			
	OUTPATIENTS					INPATIENTS					OUTPATIENTS					INPATIENTS								
	AVG. LOAD 12 MOS.	INVEN. PER BED	NO. OF VISITS	\$/VISIT	VALUE	% TOT.	VALUE	% TOT.	DAYS	\$/DAY	AVG. LOAD 12 MOS.	INVEN. PER BED	NO. OF VISITS	\$/VISIT	VALUE	% TOT.	VALUE	% TOT.	DAYS	\$/DAY	VALUE WARD ISSUES	NO. OF INPAT. DAYS	COST PER DAY	
JULY																								
AUG.																								
SEPT.																								
OCT.																								
NOV.																								
DEC.																								
TOTAL																								

RECAPITULATION SHEET

Part I Workload

Part II Pharmacy Meetings

Part III Personnel

Part IV Inventory Status

Part V Inventory Status

Part VI Unit Value—Drugs Issued

Part VII Issues to Services

preparation of the monthly report on stock control, drug costs, workloads, indoctrination, and teaching of junior hospital pharmacists and, in some instances, senior pharmacy students; as well as time spent in attendance and preparation for staff and Pharmacy Committee meetings. I ask you—does your hospital administrator know that your department is active in these activities or have you drifted along, leaving him with that out-dated concept of hospital pharmacy that considers your department "a drug room activity," a place where pills and tablets are taken from big bottles and placed into little bottles? The responsibility is yours to see that management knows of your full departmental activities, such as these and their attending problems.

Total personnel is reported in Part III of the monthly report. All personnel assigned to the department, even though part of their time is spent in other areas, are reported. This serves to bring to the attention of the administrator the added responsibilities of pharmacy personnel in non-pharmaceutical duties.

Administrators, in reviewing a report such as this, may well ask—what are the normal workload standards for a hospital pharmacist? What is a normal production load so that it can be compared against the load reported? To my knowledge, no average workload factor has been developed by hospital pharmacy. Our Association might well consider a time and motion study of this problem. I am told that a pharmacy guild or union in the New York City areas allows its members to compound and dispense a maximum of 40 prescriptions daily, the balance of time in the work day is utilized in performing less exacting duties.

STANDARDS

The Pharmacy Branch of the Division of Hospitals has tentatively set its standards in determining personnel needs on a normal work day in terms of 100 items per day. It should be noted that this is an average number of units dispensed, prepackaged, and manufactured, and that this includes a time allowance for all such items as covered in the "non-measurable workload" referred to above.

VALUE

In the monthly report form before you, the hospital administrator has a yardstick or measurement tool for his Pharmacy Department; he knows monthly and annually (see annual recap sheet) the answers to the professional workload, the committee activities, and the personnel structure, as well as the pharmacy's inventory status, inventory value per active bed, average cost of medications per outpatient visit, and average cost or value of inpatient medications per inpatient day. Nothing is left to guess work or estimates. Should you need increased man-power, you have proof of the need. Should the administrator be short on funds, you have proof of your needs based on usage rates; proof that you can release Pharmacy budget funds to other areas or that Pharmacy must not be cut if normal service flow is to be maintained. Note too that irrelevant material is conspicuous by its absence in such a report as this. To aid in the daily recording of the statistics indicated in this report, a daily manufacturing worksheet and a pharmacy dispensing worksheet are utilized. A recap sheet picturing a full year's activity of the department is also part of the record system. Copies of these three forms are available for your inspection.

CONCLUSION

In conclusion, may I emphasize once again that you, as chiefs of Pharmaceutical Services, serve in a dual capacity, of professional and businessman. As you succeed in *both*, not in one area alone, determines the success of your department. In connection with the *business of hospital pharmacy*, let me assure you that attention and interest to your "management tools" such as storeroom layout, stock location, physical and perpetual inventory systems, basic drug lists, Pharmacy Committee activities and monthly and annual reports pay big dividends in the proper growth and development of your department. Treat then not lightly the business side of hospital pharmacy if you seek a well functioning pharmaceutical service for your institution.

sleep here ▶

*Living accommodations
will be provided
at Whitney Hall*



eighth institute
on hospital pharmacy
TORONTO

June 23-27

◀ *meet here*

*Hart House
Where Institute
lectures will be held.*

The Eighth Institute on Hospital Pharmacy will be held on the campus of the University of Toronto, Canada, June 23 to 27 inclusive. The Institute is sponsored by the American Hospital Association, American Pharmaceutical Association, American Society of Hospital Pharmacists, Canadian Society of Hospital Pharmacists and Canadian Hospital Council.

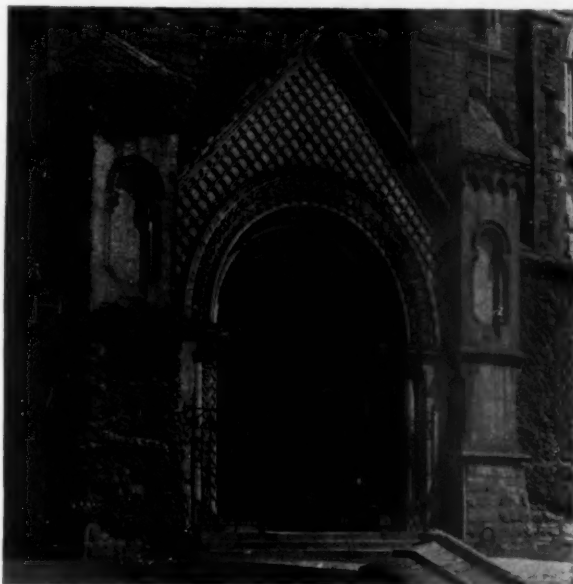
The purpose of these meetings is to present a refresher program on the several facets of hospital pharmacy practice. The program has been designed to include lectures and demonstrations on several phases of hospital pharmacy including administration, organization, planning, manufacturing, dispensing, and the relations of the Pharmacy Department to other hospital units.

Applicants must be a pharmacist in a hospital that is an institutional member of the American Hospital Association, or a personal member of the American Pharmaceutical Association and the American Society of Hospital Pharmacists.

All meetings of the Institute will be held at Hart House on the University of Toronto campus. Living accommodations will be provided at Whitney Hall, a University building. Most of the rooms at Whitney Hall are double rooms with twin beds; a limited number of single rooms are available. Arrangements for enrollees to obtain meals at a nearby restaurant are being made.

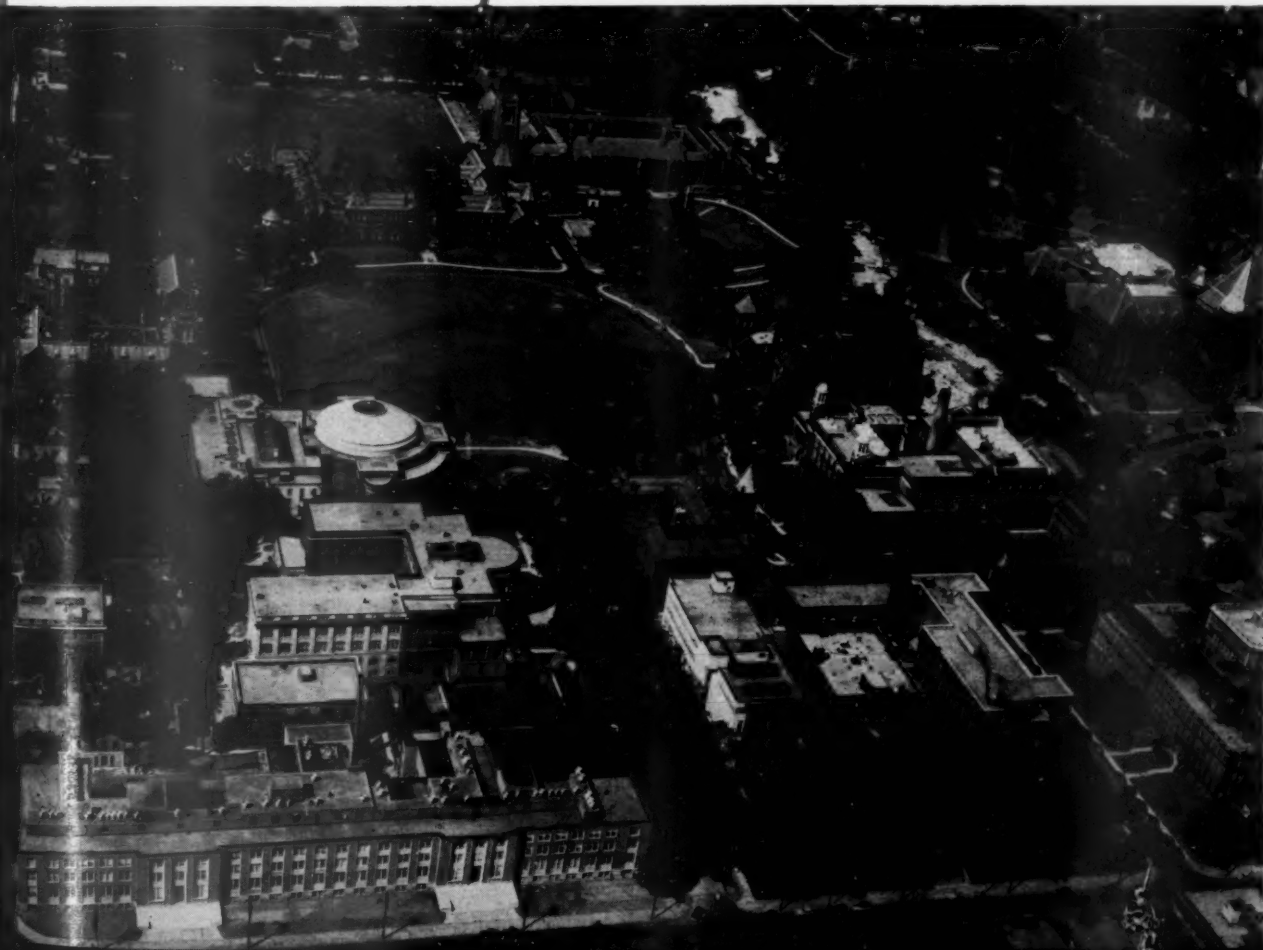
see this

*The doorway of University College—
one of the most beautiful in North America*



The tuition fee is \$35.00, payable to the American Hospital Association. Members of the ASHP will soon receive application blanks for the Institute. These should be filled out and returned with the fee to the American Hospital Association.

the Toronto campus Site of the 1952 Institute



THE FACULTY

ARCHAMBAULT, GEORGE F., chief, Pharmacy Branch, Division of Hospitals, U. S. Public Health Service, Washington, D. C.

ARMSTRONG, R. FRASER, superintendent, Kingston General Hospital, Kingston, Ontario.

ASQUITH, MARY, chief pharmacist, Stratford General Hospital, Stratford, Ont.

BECK, ALLEN V. R., chief pharmacist, Indiana University Medical Center, Indianapolis.

BJERKE, PAUL G., chief pharmacist, Luther Hospital, Eau Claire, Wis.

BOWLES, GROVER C., chief pharmacist, Strong Memorial Hospital, Rochester, N. Y.

BUCK, FREDERICK D., chief pharmacist, Kingston General Hospital, Kingston, Ont.

BURR, CHARLES W., chief pharmacist, Royal Jubilee Hospital, Victoria, B. C.

BUSS, WALDO W., associate director, University Hospital, Ann Arbor, Mich.

DANOWSKI, THADDEUS, M.D., professor of Research in Medicine, University of Pittsburgh, Pittsburgh, Pa.

DARROW, DANIEL C., professor of pediatrics, Yale University, New Haven, Conn.

De NAVARRE, MAISON G., Cosmetic Laboratories, Inc., Detroit, Mich.

DAVIS, ARTHUR, Veterans Administration, Pharmacy Division, Washington, D. C.

FERGUSON, J. K. W., M.D., professor of pharmacology, University of Toronto, Ont.

FISCHELIS, ROBERT P., Sc.D., secretary, American Pharmaceutical Association, Washington, D. C.

FLACK, HERBERT L., chief pharmacist, Jefferson Medical College, Philadelphia, Pa.

FRANCKE, DON E., chief pharmacist, University Hospital, Ann Arbor, Mich.

FRAZIER, WALTER M., chief pharmacist, Springfield City Hospital, Springfield, Ohio.

GEIGER, E. BURNS, chief, Pharmacy Division, Veterans Administration, Washington, D. C.

GOUDY, LEONARD P., secretary, Council of Administrative Practice, American Hospital Association, Chicago, Ill.

HOGAN, T. JOSEPH, chief, Construction and Maintenance Branch, Division of Administrative Management, Public Health Service, Washington, D. C.

HUGHES, F. N., Ph.D., professor of pharmacy, University of Toronto, Ont.

HUGHES, GORDON H., Hospital Design Division, Ottawa, Ont.

KLEMMER, CARL, Ph.D., Strong Cobb Co., Cleveland, Ohio.

MARTIN, STANLEY W., associate executive secretary, Ontario Hospital Association.

NIEMEYER, GLORIA, assistant director, Division of Hospital Pharmacy, Washington, D. C.

OLNYK, IRENE, chief pharmacist, Women's College Hospital, Toronto, Ont.

PHILLIPS, GEORGE L., assistant chief pharmacist, University Hospital, Ann Arbor, Mich.

PURDUM, W. ARTHUR, chief pharmacist, Johns Hopkins Hospital, Baltimore, Md.

ROBSON, E. M., director of nursing, Peterborough General Hospital, Peterborough, Ont.

ROGAN, JANE L., chief pharmacist, Evangelical Deaconess Hospital, Detroit, Mich.

SCOTT, EVLYN GRAY, chief pharmacist, St. Luke's Hospital, Cleveland, Ohio.

SHIELDS, HARRY J., M.D., Department of Anesthesiology, University of Toronto, Ont.

SISTER MARY FLORENTINE, chief pharmacist, Mt. Carmel Hospital, Columbus, Ohio.

SMITH, AUSTIN, M.D., editor, Journal of American Medical Association, Chicago, Ill.

STATIA, PERRIN C., chief pharmacist, Kitchener General Hospital, Kitchener, Ont.

STUART, EUGENIE M., assistant professor in hospital administration, University of Toronto, Ont.

TOWNE, CHARLES G., chief pharmacist, Veterans Administration Center, Los Angeles, Calif.

WILSON, L. M., M.D., professor of medicine, Queens University, Kingston, Ont.

ZAHALAN, FRANK, chief pharmacist, Montreal General Hospital, Quebec.

ZOPF, LOUIS C., professor of pharmacy, University of Iowa, Iowa City.

MONDAY, JUNE 23

Hospital Pharmacy Organization

DON E. FRANCKE, *Presiding*

8:30 A.M. Registration

9:30 A.M. Introductions, Greetings, and Instructions to Registrants

10:00 A.M. Hospital Administration and Responsibilities of Pharmacy Service R. FRASER ARMSTRONG

10:40 A.M. Discussion GROVER C. BOWLES

11:00 A.M. Developments in Nursing Service and Education Which Require Changes and Improvements in Pharmacy E. M. ROBSON

11:45 A.M. Discussion FREDERICK D. BUCK

ROBERT P. FISCHELIS, *Presiding*

1:30 P.M. Elements of Present Purchasing in the Hospital As It Pertains to the Pharmacy Department WALDO W. BUSS

2:15 P.M. Discussion HERBERT L. FLACK

2:30 P.M. Hospital Accounting and Considerations of Pharmacy Department Operation STANLEY W. MARTIN

3:15 P.M. Discussion JANE L. ROGAN

3:30 P.M. Recess

3:45 P.M. Basic Objectives of Hospital Pharmacy Practice DON E. FRANCKE

4:30 P.M. Discussion CHARLES W. BURR

6:00 P.M. Buffet Dinner

Evening: Social Hour

TUESDAY, JUNE 24

Hospital Pharmacy Workshop and Planning

LEONARD P. GOUDY, *Presiding*

9:00 A.M. Explanation of the purpose of the session and the method of conducting workshops. Groups will be assigned at this time.

9:15 A.M. Explanation and Demonstration of Phillips 66 Technic EUGENIE M. STUART

9:30-12:00 Problems in Hospital Pharmacy

Group 1—Pharmacy Problems in Small Hospitals

Leaders CHARLES W. BURR and PAUL G. BJERKE

Group 2—Pharmacy Problems in V.A. Hospitals

Leaders E. BURNS GEIGER and ARTHUR DAVIS

Group 3—Charges for Drugs; Pharmacy Mark-ups for both Inpatients and Outpatients

Leader GLORIA NIEMEYER

Group 4—Are Exhibits by Pharmaceutical Companies Desirable in Hospitals?

Leader GROVER C. BOWLES

Group 5—Therapeutics Committee and Hospital Formulary

Leader W. ARTHUR PURDUM

Group 6—Technics in Handling Requests to Administrator

Leader GEORGE R. ARCHAMBAULT

EIGHTH INSTITUTE PROGRAM

Group 7—What Should be the
Relationship between Pharmacy
and Central Supply?

Leader PERRIN C. STATIA

Group 8—Teaching Hospital Pharmacy

Leader LOUIS C. ZOPF

CHARLES W. BURR, *Presiding*

1:30 P.M. Meeting Problems of
Design for New and Established
Hospital Pharmacies T. JOSEPH HOGAN
and GEORGE F. ARCHAMBAULT

2:15 P.M. Discussion GORDON HUGHES

2:25 P.M. Motion Pictures on Time
and Motion Studies

2:55 P.M. Equipment and Layouts
for Small-volume Production
of Pharmaceuticals CARL KLEMME

3:40 P.M. Discussion ALLEN V. R. BECK

3:55 P.M. Recess

4:10 P.M. Efficient Utilization
of Personnel Time ALLEN V. R. BECK
and WALTER FRAZIER

7:30 P.M. Panel Discussion: Conclusions and
Questions from the Workshop Sessions
Leader GLORIA NIEMEYER

WEDNESDAY, JUNE 25

Hospital Pharmacy Administration

FREDERICK D. BUCK, *Presiding*

9:00 A.M. Newer Compounding Aids for the
Hospital Pharmacist LOUIS C. ZOPF

9:45 A.M. Discussion

9:55 A.M. Organization and Operation of Pharmacy
Outpatient Service CHARLES G. TOWNE

10:40 A.M. Discussion WALTER M. FRAZIER

10:50 A.M. Recess

11:05 A.M. Formulation of New
Manufactured Products FRANK ZAHALAN

11:50 A.M. Discussion PAUL G. BJERKE

WALTER FRAZIER, *Presiding*

1:30 P.M. Professional and
Public Relations PAUL G. BJERKE

2:15 P.M. Assay and Control of
Manufactured Products in
Hospital Pharmacy LOUIS C. ZOPF

3:00 P.M. Discussion EVLYN GRAY SCOTT

3:10 P.M. Cosmetic Aspects of Pharmaceutical
Ointments MAISON G. DE NAVARRE

3:50 P.M. Recess

4:05 P.M. Responsibilities of the Chief
Pharmacist for the Training of
Pharmacy Interns EVLYN GRAY SCOTT

4:50 P.M. Useful Formulas for the
Hospital Pharmacist HERBERT L. FLACK

7:30 P.M. Panel Discussion: Minimum Standard
for Pharmacies in Hospitals

Leader W. ARTHUR PURDUM

THURSDAY, JUNE 26

Current Trends in Pharmacology and Therapeutics

GEORGE F. ARCHAMBAULT, *Presiding*

9:00 A.M. The Nature and Clinical Use
of Resins and Salt Substitutes

THADDEUS DANOWSKI

9:45 A.M. Clinical Use of
Parenteral Fluids DANIEL C. DARROW

10:45 A.M. Recess and Refreshments

11:00 A.M. Current
Investigational Drugs AUSTIN SMITH

11:40 A.M. Question Period

LEONARD O. BRADLEY, *Presiding*

2:00 P.M. Role of Enzymes in
Medical Practice J. K. W. FERGUSON

3:00 P.M. Newer Anesthetic Agents and
Allied Drugs HARRY J. SHIELDS

3:40 P.M. Recess and Refreshments

4:00 P.M. Current Status of
Endocrine Drugs L. M. WILSON

4:40 P.M. Question Period

Preparation of Parenteral Fluids

FRIDAY, JUNE 27

ALLEN V. R. BECK, *Presiding*

9:00 A.M. Chemistry and Incompatibilities of Some
of the Newer Drugs F. N. HUGHES

9:40 A.M. Discussion W. ARTHUR PURDUM

10:00 A.M. Physical Aspects and Equipment of
Sterile Solutions Room GEORGE L. PHILLIPS

10:40 A.M. Distilled Water
and Stills T. JOSEPH HOGAN

11:20 A.M. Recess and Refreshments

11:30 A.M. Sterilization of
Pharmaceuticals SISTER MARY FLORENTINE

IRENE OLYNK, *Presiding*

1:30 P.M. Assay and Sterility Tests for
Parenteral Fluids W. ARTHUR PURDUM

2:10 P.M. Formulas, Technics,
and Special Precautions for Parenteral
Preparations GROVER C. BOWLES

2:50 P.M. Recess and Refreshments

3:10 P.M. Demonstration: Technics in the
Preparation of Parenteral Solutions
Leader GEORGE L. PHILLIPS

4:30 P.M. Question Period

6:30 P.M. Institute Dinner and Award of
Certificates G. HARVEY AGNEW



WALTER REED Army Hospital is a 1,700 bed general hospital located in the northwest section of Washington, D. C. It is a component activity of Walter Reed Army Medical Center which also includes the Army Medical Service Graduate School, the Army Prosthetics Research Laboratory and the Central Dental Laboratory. The Pharmacy Service is organized as a professional service of Walter Reed Army Hospital under the direct control of the commanding general.

PERSONNEL

Authorized personnel includes one Medical Service Corps Officer, who is a graduate registered pharmacist, five civilian registered pharmacists, and six enlisted persons who, in many instances, are also registered pharmacists.

The chief of Pharmacy Service is responsible to the commanding general, Walter Reed Army Hospital, for overall hospital pharmacy service, including proper operation of the pharmacies, maintenance of necessary records, and for checks

PHOTOS AT RIGHT

- 1 The 35 cubic foot stainless steel biological refrigerator used to store biologicals, suppositories and eye solutions.
- 2 The bulk manufacturing room with 30 gallon and/or 100 gallon mixing tanks, 50 gallon and 100 gallon storage tanks, tablet machine, piston-type tube and jar filling machine, and drug storage cabinets.
- 3 A section of the outpatient pharmacy showing receiving and dispensing windows, prepackaged medications and prescriptions being filled.



pharmacy service

WALTER REED

army hospital

by CAPT. JACK W. McNAMARA

and verifications required by regulations. He is a member of the Therapeutic Agents Board and is responsible for periodically revising the *Formulary*. He also makes the necessary checks for excess and deteriorated drugs in ward, clinic, and department medicine cabinets.

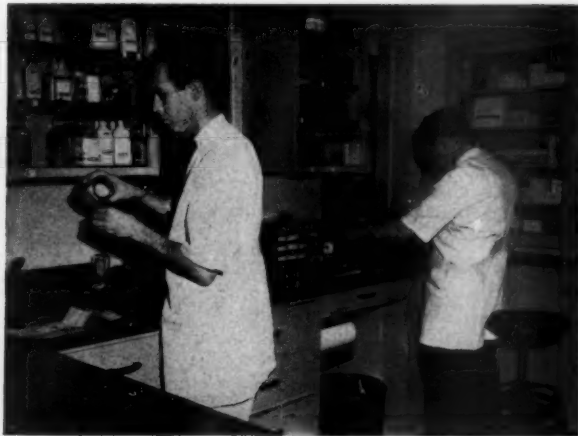
Each pharmacy is assigned a registered pharmacist known as a senior pharmacist who is capable of operating a hospital pharmacy with

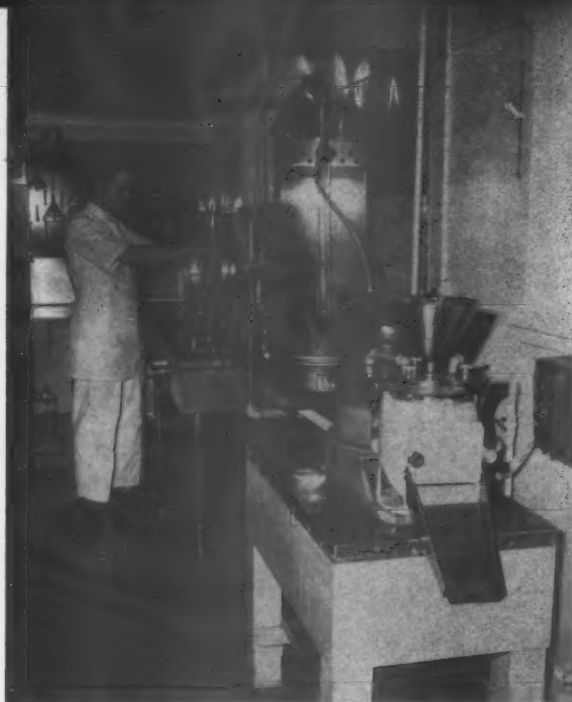
CAPT. JACK W. McNAMARA, MSC, is chief of pharmacy Service, Walter Reed Army Hospital, Washington.

a minimum of supervision. Other personnel work on a rotating basis according to qualifications and training.

PHYSICAL PLANT AND EQUIPMENT

The hospital pharmacy is located on the ground floor of the main hospital building. It consists of five rooms with approximately 1,200 square feet of floor space. The outpatient pharmacy, on the first floor of the outpatient building, has 400 square feet of floor space. Storage space for drugs





Another view of the bulk manufacturing room with colloid mill, Barnstead water still and stainless steel sink.

at the medical supply warehouse is approximately 6,000 cubic feet. Cabinets in both pharmacies are sheet metal with baked enamel finish. The working surfaces are either black chemical-resistant asbestos-stone composition or black pressed wood. Floors are covered with rubber composition. Both pharmacies are fluorescent lighted. All hospital pharmacy sinks are stainless steel while those in the outpatient pharmacy are Alberene stone composition.

In addition to glassware and other items common to all hospital pharmacies, manufacturing and packaging equipment includes the following:

- 1 Colloid mill, belt driven, 3 speed, 5 horsepower, stainless steel
- 1 Ointment mill, Day Harris No. 1, 1 horsepower, stainless steel
- 1 Pony Mixer, Day No. 00, 1 horsepower, stainless steel
- 1 Filter press, sealed disc, 8 inch, 20 ring $\frac{1}{2}$ horsepower, stainless steel
- 1 Bottle filler, 4 spout, vacuum type, semi-automatic, stainless steel
- 1 Tube and jar filler, piston type, hand operated, stainless steel
- 1 Collapsible tube closing machine motor powered
- 1 Refrigerator, biological, 35 cubic feet, stainless steel
- 1 Labelling machine, Monarch Junior
- 1 Tablet machine, Eureka, motor powered
- 1 Suppository machine, Armstrong, hand operated
- 2 Suppository molds, 50 compartment and 35 compartment
- 53 Tray, drug, 12 by 15 by 5 inches, stainless steel
 - 1 Tank, storage, 50 gallon, glass lined
 - 1 Tank, storage, 100 gallon, glass lined
 - 2 Tank, storage, 100 gallon, stainless steel
 - 1 Tank, mixing, 100 gallon, stainless steel
 - 1 Tank mixing, 30 gallon, stainless steel
 - 2 Mixer, propeller type, $\frac{1}{4}$ horsepower
 - 1 vacuum pump, Hy-Vac
 - 1 pH meter, Beckman Model G

- 2 Homogenizer, hand, stainless steel
- 2 Blender, Waring, stainless steel
- 1 Oven, drying, small, stainless steel
- 1 Still, water, Barnstead, 5 gallons per hour, gas
- 1 Still, water, Stokes, $2\frac{1}{2}$ gallons per hour, gas

MEDICINAL AGENTS

Approximately 1,200 drug preparations are available to the hospital staff from the Pharmacy Service. Over 700 items can be obtained through the Armed Services Catalog of Medical Material. Drugs procured through this source are ordered weekly, using sense-marked cards in conjunction with an IBM system. Two hundred thirty items are purchased on a quarterly basis direct from the manufacturer or his local contractor. Drugs from either source are, with few exceptions, ordered by generic or common names rather than trade names.

The Pharmacy manufactures over 270 formulations including 142 liquid preparations, 54 ointments and powders, 23 eye solutions, 23 suppositories and 26 capsules. Individual prescriptions average 360 daily, based on a five day week. This is in addition to furnishing medications to over 60 wards, clinics and departments.

THERAPEUTIC AGENTS BOARD

The Therapeutic Agents Board is composed of the chief of Surgical Service, the chief of Medical Service and the chief of Pharmacy Service. Its purpose is to make recommendations for the use at Walter Reed Army Hospital of medicinal agents not available through the Armed Services Catalog of Medical Material, and to make recommendations to the Army Medical Research and Development Board regarding items to be included in the catalog. As a member of this Board it is the duty of the chief of Pharmacy Service to bring to the Board's attention the latest developments in new drugs, and any requests from staff members for drugs not previously available.

FORMULARY

The second edition, and probably the last of the Formulary as a Walter Reed Army Hospital publication, was published during 1951. The present edition will serve as a basis for an Army-wide drug formulary in the near future.

LIBRARY

The Walter Reed Army Hospital Medical Library is one of the most comprehensive and up-to-date medical libraries in the United States. Supplementing its extensive facilities, the pharmacy has, for routine reference, more than 40 of the latest editions pertaining to various phases of pharmacy and medicine. Periodicals include both editions of the *Journal of The American Pharmaceutical Association*, *THE BULLETIN OF THE SOCIETY OF HOSPITAL PHARMACISTS*, *Ameri-*

can *Professional Pharmacist*, *Science, Drug and Cosmetic Industry*, *Squibb Abstracts*, *Unlisted Drugs*, *Modern Drugs* and various house organs published by drug manufacturers.

Information published by drug companies is filed according to manufacturer but unless such material pertains to specific new drugs, or is basic in nature, it is not kept. When literature appears to be of definite value, however, several hundred copies are obtained and distributed to the doctors, nurses, wards, and clinics.

DRUG DISTRIBUTION TO WARDS AND CLINICS

Each ward and clinic is furnished with a stainless steel drug tray, 12 by 15 by 5 inches, equipped with a carrying handle. For routine medications the nurse fills out the bulk drug order form in duplicate and places the order, narcotic prescriptions, and empty containers in this tray. At 7 o'clock each morning except Sundays and holidays, pharmacy personnel begin picking up the trays using a large cart built for this purpose. By 10:30 a.m. the bulk drug orders and narcotic prescriptions have been filled and delivered. Narcotic stocks are ordered on prescriptions signed by a medical or dental officer. When delivered, the duty nurse signs the prescriptions as receiving officer. The prescription is then brought back to the Pharmacy and filed. Each month the Pharmacy reports to the hospital inspector on types and quantities

of narcotics issued to wards and clinics. The ward and clinic narcotic records are closed and sent to the Hospital Inspector the first day of each month to be checked against the Pharmacy report. Assistant hospital inspectors also personally check the pharmacy, ward, and clinic narcotic stocks once each month.

BULK MANUFACTURING AND PACKAGING

Whenever usage warrants, items manufactured by the Pharmacy Service are made in the largest quantities possible, limited only by equipment, capacity and storage facilities. Soap solution, antiseptic wash, and Zephiran solution are made in 50 or 100 gallon quantities. Other fluid preparations, such as Benadryl elixir and basic lotion, are manufactured in 30 gallon quantities and then bottled in regular prescription sizes using the vacuum bottle filling machine for this purpose. Many ointments, creams, and pastes are made in 50 to 100 pound lots and then filled into jars or tubes using the special jar and tube filling machine and the collapsible tube closing machine. All items prepacked in this manner are identified by the use of temporary "Senso" labels. When the item is used to fill a prescription the "Senso" label is removed and placed on the written prescription.

Eye solutions, buffered, preserved, and made isotonic with the blood, are prepared once a month

Another view of the main Pharmacy dispensing section showing dispensing window, work tables, and locked narcotic cabinets in upper right hand corner.



in 250 cc. to 1,500 cc. quantities. These solutions are filtered through sintered glass and stored under refrigeration. Citrate buffer solutions for urinary irrigation are made in quantities of 80 to 100 bottles, 1,500 cc. each, utilizing the Fenwal system available in Central Supply. Bulk parenteral solutions are not made either by the Pharmacy Service or Central Supply, but are obtained from commercial sources.

A number of manufacturing problems peculiar to Army Pharmacy arise from the Armed Services policy of making available a minimum number of dosage forms of each drug. In order to conserve local funds, and whenever economically feasible, catalog items are utilized to manufacture other dosage forms. Chloromycetin capsules are used to make chloromycetin cream and ointment; aureomycin capsules are used to make aureomycin ointment, aureomycin elixir and aureomycin ear drops; Benadryl capsules are used to make Benadryl elixir, Benadryl expectorant and Benadryl cream; Vioform suppositories are made from vioform powder.

PRODUCT DEVELOPMENT

New product development and improvement of old products is a never ending process at the Walter Reed Army Hospital Pharmacy. With a dermatology staff of seven assigned medical officers and five civilian consultants, formulation of various dermatological preparations demands constant attention to the latest developments in this field.

At the request of the Dermatology Section, a vanishing type emulsified base was developed which upon application will disappear with very little rubbing. This ointment—the result of over 40 formulations and modifications—is based on stearic acid emulsified with non-ionic emulsifiers. Other formulations, containing large amounts of waxes, cetyl or stearyl alcohol, did not have the desired vanishing properties.

Recently, a hydro-alcoholic solution was developed for the treatment of various fungus infections including tinea capitis and *Trichophyton rubrum* infections of the hands, feet and body. This preparation contains several fatty acids, their sodium and copper salts, salicylic acid and a wetting agent. In preliminary clinical trials this solution showed indications of being superior to the many commercial preparations now available. A further clinical evaluation of this product is now underway at two other Army hospitals.

Zirconium salts, which may be of value in treating a variety of dermatoses, are also being investigated in formulations such as creams, lotions, and powders.

Other recent product developments include a water-soluble suppository base formulated with polyoxyethylene stearates, an oral fat emulsion containing four calories per cc., a stable oil emulsion to replace Carron Oil and a gel containing streptokinase-streptodornase, bacitracin, solublized vegetable gums and water.

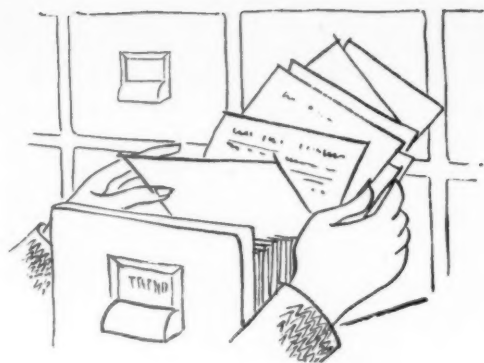
During the past two years, much work has been done by the pharmacy staff on the flavoring and coloring of syrups, elixirs and other preparations. A large number of natural and artificial flavors from commercial sources are used for experimentation. Natural fruit concentrates, however, are preferred because their flavoring qualities for syrups and elixirs are superior to artificial and other flavors obtained from commercial sources or prepared in the Pharmacy.

Contemplated product developments to be formulated and evaluated in the near future include protein-fat-carbohydrate emulsions for oral and tube feeding; antibiotic-fatty acid combinations in gels and creams; chlorophyll preparations for various purposes; and bases for enzyme systems used in removing clotted blood and fibrinous or purulent accumulations. Flexible polyethylene bottles for dermatological preparations are to be evaluated for use as spray or squeeze bottles.



Drug trays filled, checked and ready for delivery to wards and clinics. At right, another view of the Outpatient Pharmacy with drug cabinets and Stokes water still.





THERAPEUTIC TRENDS

New trends in medicine and pharmacy include
 TRIETHANOLAMINE TRINITRATE—PROTEIN-
 AMINE IN MALIGNANCIES—FUMAGILLIN
 —MORPHINE ANTIDOTE—I.V. FAT EMULSIONS

Edited by LEO F. GODLEY

PROTEINAMINE IN MALIGNANCIES

Proteinamine, a new radiomimetic agent formed by the interaction of methyl-bis- (betachloroethyl)-amine with plasma proteins, given intravenously, has been therapeutically evaluated in the treatment of malignant diseases.

In this series of patients, clinical improvement was noted in Hodgkin's disease, lymphosarcoma, acute lymphatic leukemias, and acute monocytic leukemias. There were remissions and symptomatic relief encountered in other conditions.

These investigators indicate in the *J. Lab. Clin. Med.* 38:794 (Nov.) 1951, that this therapy is comparable to that with nitrogen mustard; but that proteinamine is more desirable in that (a) it produces practically no nausea and vomiting, (b) it has a reduced hematopoietic toxicity, (c) it is tolerated by children and adults in acute leukemia, and (d) it is suitable for outpatient therapy.

FUMAGILLIN AS AMEBICIDE

The recently reported antibiotic, Fumagillin, has shown marked amebicidal activity. Twenty-two patients hospitalized with *Endamoeba histolytica* infections were given fumagillin orally in doses of 5 to 50 mg. daily. All except one patient responded favorably, although follow-up studies for several months are necessary before results can be properly evaluated.

According to the report in *Science* 115:71 (Jan. 18) 1952, there were essentially no toxicities reported in this series of patients who were given up to 50 mg. per day for two weeks. Fumagillin shows activity against at least seven enteric protozoan parasites, more specifically, however, against *E. histolytica*.

ADENOSINE INEFFECTIVE

Previous reports attesting to the value of adenosine-5-monophosphate as an antipruritic agent led this group of dermatologists at N.Y.U. Bellevue Medical Center [*J. Invest. Derm.* 5:265 (Nov.) 1951] to "assay this agent therapeutically."

The drug was given to a group of hospitalized and a group of ambulatory patients. It was administered both intramuscularly and sublingually. Evaluation of results was based upon the subjective response of the patients tested.

Patients receiving the drug had conditions of which pruritus was a significant complaint. These investigators concluded that "adenosine-5-monophosphate is not an effective antipruritic agent."

NEW MORPHINE ANTIDOTE

No specific antidote for opiate poisoning has been reported; but investigation of the pharmacology of *n*-allyl-normorphine in counteracting morphine and Demerol depression suggests that it might be such an agent.

This, administered in doses up to 10 mg., intravenously, in patients who are narcotized with doses of morphine or Demerol produces a strong respiratory and circulatory stimulation. It does not affect sedation produced by the opiates. The site of this antagonistic action is thought to be central and is apparently due to a competitive action that it exerts with the opiate for certain receptor cells.

Therapeutically, *n*-allyl-normorphine appears to be of value in treating mild to moderate opiate depression by stimulating respiration and circulation. The prime cause of death in opiate poisoning is anoxia and CO₂ accumulation. The value of this drug in treating overwhelming opiate depression, however, has not been determined; for there is a suggestion that repeated doses might cause further depression. It is also noted that this agent is ineffective against the depression produced by Pentothal, cyclopropane and ethyl ether. The above findings were reported in the *Am. J. Med. Sci.* 233:191 (Feb.) 1952.

PREGNANT MAMMALIAN LIVER

A crude extract made from the liver of pregnant mammals was found to contain an unknown substance which was capable of relieving many of the

neurological symptoms encountered by some diabetics. Peripheral neuropathy in the diabetic has long been of great concern. The symptom-complex of diabetic neuropathy may consist of one or more of the following: peripheral numbness, sticking pains, drawing pains, stiffness of extremities, burning pains, anorexia, depression, diarrhea, urinary incontinence, etc.

According to a report in the *Am. J. Med.* 12:59 (Jan.) 1952, it is thought that the therapeutic effect of this extract is due to a component not previously isolated. The B₁₂ and folic acid contents were below that required to produce reticulocytosis and results were obviously not due to these substances.

Treatment consisted of daily intramuscular doses of 5 cc. of pregnant mammalian liver extract (PMLE) for periods up to two weeks. The material is not toxic; it is painless upon injection and produces no local irritation or constitutional reactions. There were, however, in this series of 127 diabetic patients, three who elicited mild allergic responses. Excellent results were obtained in 44 percent, good in 40 percent, fair in 10 percent and failures in 6 percent.

PAS AND STREPTOMYCIN

According to a report in the *J. Lab. Clin. Med.* 38:814, (Nov.) 1951, tests were performed among the following three groups of patients to delineate the effect of PAS on the resistance elicited by the tubercle bacilli to streptomycin:

Group I—Patients receiving one gram of dihydrostreptomycin daily.

Group II—Patients receiving one gram of dihydrostreptomycin daily and 10 Gm. of PAS daily.

Group III—Patients receiving one gram of streptomycin daily and 10 Gm. of PAS daily.

In group I, cultures were 44 percent resistant after twelve weeks of therapy and 45 percent after 27 weeks. In group II, cultures were 4 percent and 6 percent resistant after the same intervals. In group III, cultures were 12 percent and 26 percent resistant after the same intervals.

Sensitivity and negativity of cultures also pointed out that the concomitant administration of PAS and streptomycin reduced the incidence of resistance of the tubercle bacilli to streptomycin.

TRIETHANOLAMINE TRINITRATE

The cardiovascular effects of triethanolamine trinitrate in both experimental animal studies and a preliminary clinical report of five cases have been described in two articles in *Canad. M.A.J.*, 65:11 and 17 (July) 1951 as somewhat dramatic. The drug which was first prepared in Germany in 1941 compares favorably as a coronary vasodilator

with nitroglycerin and its duration of action is more prolonged. There is also much less depression of the myocardium than with nitroglycerine. In animal studies the two show little difference in respect to the development of a slight tolerance to the vasodilator action on repeated injections. It is suggested that the higher coronary activity of triethanolamine trinitrate may be due to its greater water solubility than that of nitroglycerin.

The drug markedly reduced the daily number of attacks when administered to patients with angina pectoris over three week periods. No apparent side effects or toxicities were observed. The drug was given in 2 mg. doses four times daily.

The biphosphate form of the triethanolamine trinitrate was furnished by Metadier Limited of Montreal under the trade name Metamine.

I. V. FAT EMULSIONS

Parenteral fat as a source of calories is believed to have certain advantages over other therapeutic measures. Investigators have been working to develop a fat emulsion satisfactory for clinical use. In a study reported in *J. Lab. Clin. Med.* 39:176 (Feb.) 1952, four different emulsions were prepared and studied for stability, pyrogenicity and effects produced when administered to 79 human subjects. As noted in earlier studies the most common reactions to the injections of fat emulsion include fever, chills, nausea and vomiting, headache and mild anemia. Observations made using these emulsions in single and repeated injections show that in many cases the febrile reactions still exist.

All of the emulsions used contain olive oil and five percent dextrose in distilled water, the variable constituents being the emulsifying agents—Span, Asolectin,* sodium cholate, cerebroside* and lecithin fractions.

It was found that daily injections of the ten percent fat emulsion (one gram fat per kilogram body weight) for twenty-four days in two human subjects produced no evidence of toxicity. Daily injections of the 20 percent fat emulsions (3 to 4 Gm. fat per kilogram body weight) given from one to eleven days to four patients was associated with a decrease platelet count and prolonged bleeding time.

Since the emulsion containing one percent lecithin fraction was used most extensively, detailed information for its preparation, storage and use, are given.

*NOTE: ASOLECTIN WAS SUPPLIED BY ASSOCIATED CONCENTRATES, INCORPORATED, 57-01 32ND. AVE., WOODSIDE, LONG ISLAND, N. Y. AND CEREBROSIDES WAS SUPPLIED THROUGH DR. JOHN R. MOTE OF ARMOUR LABORATORIES, CHICAGO, ILL.

BOOK REVIEWS

FORMULARY AND THERAPEUTIC GUIDE OF THE NEW YORK HOSPITAL, 1951. Edited by the Formulary Committee, Donald A. Clarke, secretary. Published by Appleton-Century-Crofts, Inc., New York, N. Y. 4¾" x 7½", 355 pages, cloth bound, \$3.00.

The Formulary Committee of The New York Hospital has again prepared a model guide as stated in the Preface for "dealing with contemporary problems in therapeutics, selecting for routine use within the institution, or for prescribing in its outpatient services, therapeutic agents which represent the best available for the prophylaxis or management of disease, . . ." To the reviewer's knowledge, this Formulary Committee is the most exacting and painstaking of any such hospital group before accepting drugs for inclusion in their guide. The 1951 revision attests to the several years effort required to present a finished volume under the handicap of rapidly changing concepts in medicinal management of patients. Historically, the present New York Hospital Formulary Committee carries out the traditional formulary rules set by its predecessors and which have served as a model since their inception for all other formulary committees in U. S. hospitals.

The significant change from earlier editions (the first was published in 1816) is that the book is called a "Therapeutic Guide" as well as a formulary. Drugs are listed in alphabetical order and a concise therapeutic index is provided at the end of the volume. Here various agents are noted under therapeutic classifications. A major portion of each monograph is devoted to "Precautions," a valuable aid to physicians, to offset mis-prescribing and to sharply delimit general opinions regarding pharmacological actions.

The preface, although occasionally indulging in excessive verbiage for the average busy physician to read, contains a wealth of information for any other hospital formulary committee in the act of preparing its own institutional therapeutic guide. No other volume of its type is available to hospital pharmacists which spells out so well the functions of a formulary committee and the means used to implement its powers and responsibilities within the hospital organizational framework.

The monographs are very descriptive and in the main are reduced to useful and non-redundant information. An exception appears to be the monograph on Iodine U.S.P., which repeats material generally known to most physicians in the reviewer's experience. A few important cross-

references e. g. "Nembutal," "Seconal," "Amphojel," although representing registered trade names are not noted as supplementary to the official nomenclature. They would appear practical teaching devices for medical trainees going into practice later and would extend the usefulness of the Formulary better to smaller hospitals with large attending staffs which might wish to adopt the guide for their own institutional use.

The *Formulary and Therapeutic Guide of The New York Hospital* with the 1951 edition still maintains its traditional place in setting standards for the formulary system in hospitals in the United States. Members of the current Formulary Committee at the New York Hospital, and especially Dr. Donald A. Clarke, former apothecary-in-chief at the institution, have provided a historical monument for their efforts as well as depicting a well evaluated picture of the therapeutic armamentarium of our time.

JOHN ZUGICH

*University Hospital
Ann Arbor, Mich.*

ESSENTIALS OF PHARMACOLOGY AND MATERIA MEDICA FOR NURSES. Third Edition, 1951. Edited by Albert J. Gilbert, M.D., and Selma Moody Brawner, R. N. 343 pages. Published by C. V. Mosby Company, St. Louis. Price: \$3.75.

Planned to provide a text suitable for a thirty-hour nursing pharmacology course, and following in general the outline of the *Curriculum Guide for Schools of Nursing*, the book is divided into eighteen chapters with pertinent reference lists. A very commendable feature is the inclusion in the appendix of approximately 140 objective-type questions for purposes of study.

The initial chapter contains a statement which appears to need some clarification, inasmuch as "... man in his curiosity, with the help of Nature (God) has in addition synthesized numerous complex compounds . . ." seems to imply that God and Nature are identical, which, of course, is a fallacy. God may be referred to as the Author of Nature, but He is not Nature itself.

This third edition presents many important new drugs, among which are aureomycin, chloramphenicol, vitamin B₁₂, and G-11 soap. However, in the use of titles of drugs, an inconsistent procedure is evident. In some instances, the official title is omitted. For example, Brown Mixture is the only title given for the official

preparation, Compound Opium and Glycyrrhiza Mixture. The official drug, Meperidine Hydrochloride, is referred to as N.N.R. On the other hand, Metrazol (Phenylenetetrazol) is designated as U.S.P. The experience of the reviewer has been that an effective teaching aid is to give preference to the official titles of drugs by placing them first and by following with the synonyms or trade names in parentheses.

While in many textbooks of pharmacology, the chapter on Toxicology is placed in the first part of the book, nevertheless, it seems more logical to consider this topic, as the above authors have done, in the second-last chapter. This arrangement saves time, since the drugs and their antidotes can be studied in groups. Moreover, the student can understand more easily the toxic action of a drug after having a knowledge of the physiologic and therapeutic actions.

The reviewer agrees with the authors in that this text contains ample material in concise form, considering the limited period which is available for the course in pharmacology in the schools of nursing, where the time allotted for it is "cut down to the bone," which circumstance renders it practically impossible to cover adequately all of the material contained in the more comprehensive texts.

The style of the book is clear and the general make-up is good, which factors are indicative of and conducive to easy reading.

SISTER MARY LUDMILLA, S. S. M.

Firmin Des Loge Hospital
St. Louis, Mo.

THE ACCEPTED FLORIDA FORMULARY, Second Edition. Published by the Bureau of Professional Relations, School of Pharmacy, University of Florida, Gainesville, Fla. 4½ x 7½", 94 pages, printed, loose leaf.

An exceptional task has been accomplished in the preparation of this Formulary with much thought given in behalf of the convenience of the user as well as to the subject matter contained in the body of the volume. The general information at the beginning of the Formulary consists of such items as narcotic prescription regulations, tables of weights and measures, Latin forms for prescription use, general antidotes and treatment of poisons and labelling requirements for prescriptions. The medicinal agents are classified according to the conditions for which they are used and a typical monograph is in the form of a complete prescription. Many of the general therapeutic classifications also include pertinent general information as to the nature of the condition under treatment and remarks concerning

the status of the drugs commonly used in the therapy involved. It is to be noted that the majority of the Formulary medications are actually mixtures which require compounding by the dispensing pharmacist. Accompanying several of the monographs are notes to the pharmacist including information concerning the proper compounding procedure which will result in a medicinally and pharmaceutically elegant product. Conveniently placed inside the front cover of the Formulary is a pad of prescription blanks for use by the physician.

This Formulary contains a table of contents but not an index, though it is possible that, since the medicinal agents are listed according to conditions for use, an index would be superfluous and seldom used by the physician. Such an index would, however, be of value to the dispensing pharmacist.

JOHN S. LINDSEY

Jefferson Medical College Hospital
Philadelphia, Pa.

FORMULARY OF THE MASSACHUSETTS GENERAL HOSPITAL AND THE MASSACHUSETTS EYE & EAR INFIRMARY. 1951 Edition. Edited by John T. Murphy, Pharmacist-in-Chief and Prepared by the Pharmacy Committee. 155 pages, 4¼" x 5⅝", printed and paper bound. Available for \$1.25 from Massachusetts General Hospital, Pharmacy Department, Boston 14, Mass.

As stated in the Preface to the 1951 Edition, the principal purpose of this Formulary is to present to the staffs of the Massachusetts General Hospital and the Massachusetts Eye and Ear Infirmary a list of those preparations in common use in both institutions. Preparations are classified pharmacologically using official names exclusively in the text. An index is included listing synonyms and trade names. Many of the preparations are listed by numbers and a numerical listing of preparations is included in back of The Formulary. Apparently physicians use this system for ordering preparations by number. It would seem to offer greater possibility of error in prescribing.

This Formulary seems inclusive giving complete information on each preparation listed as well as Rules Governing Admission of Preparations to the Formulary. It is stated in the Preface that the physician is not restricted to the preparations contained in the Formulary. However, it is pointed out that it is desirable in the interest of expediting patient care, particularly in the outpatient clinics, that he confine himself, so far as possible, to the use of these formulary items.

GLORIA NIEMEYER

American Pharmaceutical Association
Washington, D. C.

The following hospital formularies are reviewed by Mr. John Lindsey, Senior Pharmacy Intern, Jefferson Medical College Hospital, Philadelphia, Pa. These formularies are examples of what hospital pharmacists, working with their Pharmacy and Therapeutics Committees, are accomplishing in a cooperative effort to promote prescribing in their institutions. Though each formulary is written for a specific institution, all accomplish the same purpose. Copies of formularies, if available for sale, can usually be obtained from the chief pharmacist. The Division of Hospital Pharmacy maintains a complete set for loan and requests may be addressed to: Division of Hospital Pharmacy, American Pharmaceutical Association, 2215 Constitution Ave., N. W., Washington, D. C.

FORMULARY OF THE DELAWARE AND MEMORIAL HOSPITALS, Wilmington, Del. Edited by Robert Bogash, chief pharmacist, Memorial Hospital and Robert Cathcart, chief pharmacist, Delaware Hospital. 4¾" x 7", 78 pages, removable rivet binding, printed.

The Formulary begins with a table of contents followed by information concerning the addition of drugs to the Formulary, the ordering of Formulary drugs, tables of equivalent weights and measures, a list of common abbreviations and narcotic prescriptions and regulations governing their writing and filling. The body of the Formulary is made up of a listing of the accepted drugs according to their therapeutic use. The individual monograph is composed of the official name of the drug, its ordinarily prescribed strength or percentage, and the form or forms in which the drug is available from the pharmacy. Where pertinent, there is appended a note of caution or a special notation setting forth a particular characteristic of the drug when used for the therapeutic purpose peculiar to it. Contraindications to the use of certain drugs are conspicuously noted accompanying the monograph. To keep the Formulary complete and up-to-date, there is a blank section for the addition of new drugs following each therapeutically classified section. The index is complete enabling one to quickly find a listed drug or preparation.

FORMULARY OF THE JEFFERSON MEDICAL COLLEGE HOSPITAL, Philadelphia, Pa. Edited by Herbert L. Flack, chief pharmacist. 127 pages, 5¼" x 7¾", mimeographed, stapled and paper bound.

The Formulary material is divided into five main sections and the pages are lettered and numbered accordingly. These sections are (1)

"General Information," containing narcotic regulations, rules governing the addition of drugs to the Formulary, pharmacy service detailing in the medical center and prescribing for outpatients; (2) "Medicinal Agents," which contains monographs for all the accepted Formulary drugs and medications, each listed alphabetically by official title; (3) "Pharmacologic and Therapeutic Index"; (4) A "Synonym Index" to aid a person seeking a Formulary drug under a trade or common name; and (5) An "Antidote Index." This indexing, as mentioned in 3, 4 and 5, aids the user of the Formulary in finding desired information but the lack of a complete index in lieu of the Pharmacologic and Therapeutic Index and the Synonym Index renders the Formulary a trifle difficult to use where a drug may be used in some therapeutically unclassified category.

A typical monograph consists of the official name of the drug and any common or trade names, the formula (if it is a mixture of several ingredients), customary indications and uses, notes of caution where applicable, available strength or concentration of the drug, quantity or number per dispensing unit, and a sample prescription including directions to the patient. Also found in the body of the Formulary are several valuable tables providing such information as barbiturate dosage and duration of action, potency comparison of vitamin capsules and injections, minimum daily requirements for vitamins, suggested dosage of Tetracaine Hydrochloride, U.S.P., for spinal anesthesia, antidotes for common poisons and a metric-apothecary table of weights and measures.

This edition is now out of print and a revised Third Edition in loose-leaf form is expected in the near future.

FORMULARY OF THE JACKSON MEMORIAL HOSPITAL, Miami, Fla. Edited by Anna D. Thiel, chief pharmacist. 4¾" x 6½", 103 pages, sample copy stapled and without cover, photolithographed.

The introduction contains information pertinent to the hospital practitioner and eventual user of the Formulary. This information includes rules

**GOOD AS IT IS
TO INHERIT A LIBRARY,
IT IS BETTER
TO COLLECT ONE**
—Augustine Birrell

and regulations pertaining to pharmacy hours, methods of ordering Formulary drugs, narcotic regulations, prescription writing, a listing of prescription abbreviations and a table of equivalent weights and measures. Also included is a complete antidote and poison index.

Formulary drugs are arranged according to therapeutic use. A typical monograph contains the official title of the drug (where one exists) and a statement of the dosage form in which the medication is supplied by the pharmacy. No mention is made, however, of standard quantities to be ordered for such items as tablets and capsules, nor is there included the conditions or indications for the use of each drug other than listed therapeutic indication. There is an index as well as a table of contents which aids in the use of the Formulary.

FORMULARY OF THE UNIVERSITY OF COLORADO HOSPITALS, Denver, Colorado. Edited by Pharmacy Committee, Samuel Kohan, chief pharmacist. 4" x 6¾", 54 pages, loose leaf printed.

This Formulary lists the accepted medicinal agents arranged according to therapeutic use, each agent bearing a notation of the form in which it is available from the pharmacy and the customary dosage of each. Where medication is the result of a mixture of several ingredients, the formula for the preparation is given. The section on "Oral Protein Supplements" presents the commercially available protein substances which are Formulary-accepted, tabulated according to carbohydrate, sodium, fat and calories per 100 grams content as well as in order of palatability, highest protein content and the highest caloric content of these preparations. The Formulary contains an index which enables one to readily find a drug listed in the body of the volume. Official and proprietary titles are used interchangeably.

NEW AND NONOFFICIAL REMEDIES, 1951. Issued under the direction and supervision of The Council on Pharmacy and Chemistry, American Medical Association. 810 pages, 5" x 7½", cloth bound. Published by J. B. Lippincott Company, Philadelphia, Pa. Price, \$3.00.

As in the past, the drugs accepted for inclusion in *New and Nonofficial Remedies* are arranged according to pharmacologic action. There are twenty-three separate sections of drugs so arranged. A typical monograph for a drug consists of the chemical or official name, the trade name or names and the manufacturer, a short description of the drug itself, the actions and uses and the dosage. Also a part of the monograph, is a listing of the commercially available preparations of

the drug, the strength and potency, form in which available and the name or names of the pharmaceutical houses offering the drug for sale.

The forward portion of the book contains such information as official rules governing admission of drugs, criteria for the evaluation of certain products, labelling requirements, decisions of the Council that may be of general interest, and metric-apothecaries tables. Approximately one half of the volume is dedicated to tests and standards of the included products. These tests include physical properties, identity tests, and assay(s) for the drugs or preparations that have been previously listed.

Also found in the book is a complete bibliography referring to the accepted drugs and preparations, an index of the distributors of the accepted items and a complete general index, thus rendering this volume the source of much helpful and valuable information.

JOHN S. LINDSAY

*Jefferson Medical College Hospital
Philadelphia, Pa.*

SURFACE-ACTIVE QUATERNARY AMMONIUM GERMICIDES. By Carl A. Lawrence, Ph.D. 246 pages, 6¼" x 9¾". Published by Academic Press, Inc., 125 East 23rd St., New York City. Price \$6.00.

Use of the surface-active quaternary ammonium germicides holds an important place in the hospital field today. The fact that these compounds exhibit not only germicidal action, but also surface-active, detergent and wetting properties gives them a unique place among the disinfectants in use. This volume offers a comprehensive review of the entire field of quaternary ammonium surface-active germicides covering their history, chemistry, biology and application.

Of particular interest to pharmacy and medicine is the section on the pharmacy and toxicology of these compounds as well as detailed information on the application of the quaternary ammonium compounds as germicides in preoperative surgery; for sterilization of instruments; in the irrigation of wounds; in urology; in obstetrics and gynecology; in ophthalmology; in otology; in orology; in dermatology; and as germicidal aerosols. Hospital pharmacists will find the list of trade names and chemical names, along with the distributor or manufacturer, an aid in knowing the terminology of the many quaternary ammonium germicides now on the market. A bibliography including 550 references along with an index keyed to the references, will serve as a valuable tool to anyone using this work.

GLORIA NIEMEYER

*American Pharmaceutical Association
Washington, D. C.*



* TIMELY DRUGS

BACIGUENT . . . Upjohn's bacitracin ointment for use in the treatment of infections of the conjunctiva, cornea, and margins of the eye lids, now contains two percent phenacaine hydrochloride. This local anesthetic alleviates the pain and discomfort associated with eye infections and also makes application of the ointment better tolerated.

* * *

CALCIUM PANTOTHENATE, RACEMIC . . . is offered for clinical trial in the treatment of certain types of lupus erythematosus, preferably administered with vitamin E. Available from Abbott, this product is a brand of the calcium salt of pantothenic acid identified as one of the vitamins of the B complex. Each green capsule contains 0.5 Gm. of calcium *dl*-pantothenate. As the relation of pantothenic acid to human nutrition is at present speculative, the use of calcium pantothenate is still in the experimental stage.

* * *

CYCLOGESTERIN . . . in the form of compressed tablets makes available for oral administration the estrogenic substances and progesterone. Recent clinical studies show that progesterone is effective orally. Cyclogesterin is indicated in the treatment of secondary amenorrhea and in functional uterine bleeding. It is available from the Upjohn Company.

* * *

EFOCAINE . . . is a long acting local anesthetic agent marketed by the E. Fougera & Co. Prolonged anesthetic action of six to twelve day's duration is achieved by injecting anesthetic agents in crystalline form suspended in a water-miscible vehicle. This preparation is said to be especially valuable for control of postoperative pain in major surgery, for operative and postoperative anesthesia in minor surgery, and for prolonged relief in nonsurgical conditions such as pruritus ani and vulvae. It contains procaine and butyl aminobenzoate in a stable, water-miscible solution. The drug is available in 20 cc. multiple dose vials.

EVANS BLUE DYE . . . for blood volume determination, is supplied by William R. Warner. It is available in ampuls containing the exact volume, 5.0 cc. (± 0.04 cc.) of a 0.5 percent solution of dye in water (25 mg. dye per ampul), packaged in units also containing a 5 cc. ampul of sterile, pyrogen-free physiological saline solution. Units are packaged in boxes of 6 and 25 each.

* * *

EXTOSEN . . . is E. R. Squibb & Sons new expectorant cough syrup for the treatment of non-productive coughs. It is intended to relieve hacking or asthma-like wheezing coughs due to common colds or bronchitis when a secretory or lubricating action is desired. Extosen is supplied in pints and gallons.

* * *

FLEA ANTIGEN . . . is now available from Cutter Laboratories allergy department. Tests may be made by the physician and the reaction sheet mailed to the Cutter allergy staff for preparation of the individual treatment set. Each treatment extract is given a serial number and may be ordered by referring to this number. Treatment sets may consist of one or more pollens or proteins, or a pollen-protein combination.

* * *

HEPARIN SODIUM INJECTION . . . is now available from Lederle in two forms. The new form has higher potency and may be added to intravenous solutions, or given intramuscularly for slow absorption effect, in the treatment of all types of venous and arterial thromboembolic disease.

The new form contains 10,000 U.S.P. Units (approximately 100 mg.) per cc. and is packaged in vials of 4 cc. Lederle's other form of Heparin Sodium Injection contains 1,000 U. S. P. Units, approximately 10 mg.) per cc. and is packaged in vials of 10 cc.

HETRAZAN . . . in liquid form is now available from Lederle. Hetrazan Diethylcarbamazine is highly specific for certain parasites, including filariae, and highly effective in the treatment of ascariasis in children.

★ ★ ★

HYDROCORTONE . . . is Merck's name for a saline suspension of hydrocortisone. Used for intra-articular injection in rheumatoid and osteoarthritic joints, the suspension produces local relief in the joints chosen for treatment and is without generalized systemic effects when administered as recommended. It is supplied in 5 cc. vials (each cc.=25 mg.) as a sterilized suspension suitable for intra-articular injection through a 20-gauge, or larger needle.

★ ★ ★

ICHTHYOL . . . the trade name for ammonium ichthyol sulfonate, is now supplied as an ointment or liquid by The Ichthyol Co., Division of Schering Corporation.

★ ★ ★

LYOVAC PLASMA . . . for ophthalmic use, has recently been released by Sharp and Dohme. This is a preparation of irradiated normal human plasma which acts as a physiologic suture in eye surgery and skin grafting in combination with thrombin solution. When applied with thrombin, plasma is useful in operations for cataract, glaucoma and strabismus. In keratoplasty, corneal lacerations and retinal detachments, healing is accelerated and operating time is shortened by the application of plasma-thrombin fixation. Lyovac Plasma supplied in this convenient dosage form may also be indicated in skin grafting and traumatic lacerations.

Lyovac Normal Human Plasma is packaged in a Vacule vial, and the lyophilized material is restored with 2.5 cc. of sterile diluent (0.1 percent citric acid solution), supplied with the vial, to liquid plasma on one-half the original volume. It represents 5 cc. of pooled original plasma.

★ ★ ★

MI-CEBRIN . . . is a vitamin mineral supplement providing all of the essential vitamin factors plus those trace mineral elements believed to be indispensable to good health. Mi-Cebrin is a Lilly product.

MYTOLON CHLORIDE . . . is a synthetic skeletal muscle relaxant adjunct to surgical anesthesia. It is Winthrop-Stearns, brand of benzoquinonium chloride. Mytolon Chloride is supplied as a 0.3 percent solution in multiple dose vials of 10 cc., each cc. containing 3 mg. It is administered intravenously and in all cases, dosage should be adjusted according to age, size and physical state.

★ ★ ★

NITROL OINTMENT . . . is a preparation of two percent glyceryl trinitrate in a lanolin base, having a vasodilator action which increases the blood flow and raises surface temperature. Nitrol is therefore used to lessen characteristic painful, burning response to cold and warmth; restores skin coloration to normal tone; improves usefulness of affected members; and protects against development of ulceration and aids in healing of necrotic foci. The ointment is supplied in two ounce jars, two ounce tubes and one pound jars by Kremers-Urban Company, Milwaukee, Wis. References to the clinical work using Nitrol appear in the *Wisconsin Med. J.* 47:833 (Sept.) 1948; *Proc. Staff Meet. Mayo Clin.* 25:657 (Nov. 22) 1950; and *Circulation* 3:681 (May) 1951.

★ ★ ★

NORMOCYTIN . . . is now available in a new strength. Each cc. of the new preparation announced by Lederle Laboratories contains 60 micrograms of a concentrate of vitamin B_{12b} and B₁₂ prepared from *streptomyces* fermentation. This preparation is highly effective in the treatment of pernicious anemia.

★ ★ ★

PANCEBRIN . . . is an aqueous type multiple vitamin preparation for parenteral administration available from Eli Lilly. It is indicated for the prevention and treatment of multiple-vitamin deficiencies and is especially useful in conditions where absorption or utilization of vitamins is impaired, as in diarrhea, peptic ulcer, colitis, and regional enteritis. Pancebrin is supplied in 2 cc. ampuls and in 10 cc. rubber-stoppered ampuls. It remains potent for at least eighteen months when stored in a refrigerator.

★ ★ ★

PEN-EFF . . . is an effervescent penicillin tablet containing 250,000 units of specially buffered crystalline potassium penicillin G. The tablet is dissolved in water and taken orally as a sparkling

and pleasant-tasting liquid. Pen-Eff tablets contain 300 percent more buffering alkali than any other penicillin tablet. It may be administered regardless of mealtime and thus allows the physician to plan dosage schedules with maximum convenience and flexibility. It is effective with only three doses daily.

Pen-Eff is indicated in the treatment of infections due to penicillin-sensitive organisms, especially the pneumococcus, hemolytic streptococcus, certain staphylococci and the gonococcus. For adults and older children, the recommended dosage is two tablets completely dissolved in one-half glass of water, repeated approximately every eight hours. For younger children, one tablet dissolved in one-fourth glass of water is recommended approximately every eight hours.

Because the Pen-Eff bottle is specially designed to keep out moisture, prescriptions should always be written for 12 tablets—or multiples thereof. Pen-Eff is unstable when not dispensed in the original package.

* * *

PRANTAL METHYLSULFATE . . . is Schering's name for diphenmethanil methylsulfate, an anticholinergic agent. It is indicated in peptic ulcer and other conditions where it is desirable to reduce gastric acidity and motility of the stomach. Side effects such as mydriasis, dryness of the mouth, urinary retention and constipation are rarely produced. The recommended dosage is one 100 mg. tablet four times daily for four to six weeks. In some cases it may be advisable to modify the dosage depending upon severity or for maintenance of the case.

* * *

PROPASA . . . is Sharpe and Dohme's name for effervescent tablets of *para*-aminosalicylic acid. When dissolved in water, Propasa tablets form a mildly saline effervescent solution which has a distinct advantage over the original plain PAS tablets. They are pleasant-tasting and, therefore, more tolerable to the patient with respect to the required consumption of large doses. Patients prefer the effervescent tablets, and are able to increase the beneficial dosage. Each effervescent tablet of Propasa contains 1.0 gram of *para*-aminosalicylic acid.

* * *

STREPTOMAGMA . . . is Wyeth's preparation of dihydrostreptomycin sulfate and pectin with kaolin in alumina gel. Indicated in the treatment of infectious diarrheas due to streptomycin-sensitive bacteria, the dihydrostreptomycin is for intestinal

disinfection and the kaolin suspended with pectin in alumina gel for control of diarrhea. For oral use, four teaspoonfuls of Streptomagma three or four times daily before meals are recommended.

* * *

SUSTINEX . . . is a preparation of vitamin B complex in a cola flavored syrup available from McNeil Laboratories. Each fluid ounce contains: thiamine hydrochloride, 36 mg., riboflavin, 3 mg., niacinamide, 180 mg., pethenol, 6 mg., pyridoxine hydrochloride, 6 mg. and vitamin B₁₂, 12 mcg.

* * *

TERRAMYCIN ORAL SUSPENSION . . . is available from the Chas. Pfizer and Co. It is a raspberry-flavored dosage form of Terramycin. It is supplied as a combination package consisting of a vial containing 1.5 Gm. of crystalline Terramycin and a bottle containing one fluid ounce of pleasantly flavored, buffered diluent. The suspension which results from mixing the two substances contains 250 mg. of Terramycin per teaspoonful.

* * *

VI-MIX DROPS . . . is a new concentrated vitamin preparation for pediatric practice. Supplied as Multiple Vitamin Drops by Eli Lilly, the combination package contains nine essential vitamins. Vitamin C and vitamin B₁₂, which are relatively unstable in solution, are bottled in the dry state, along with thiamine chloride and riboflavin. The remaining five vitamins are dissolved and stabilized in a delicately flavored diluent. The solution is added to the dry form either at the prescription counter or in the home. This assures a fresh solution which may be depended upon to be fully potent.

* * *

ZYMALIXIR . . . is Upjohn's Zymatinic Drops formula extended to make it suitable for teaspoonful administration to adults and children. Each five cc. of the liquid contains ferrous gluconate, 130 mg. (equivalent to 15 mg. of iron); liver concentrate, 65 mg.; thiamine hydrochloride, 1 mg.; riboflavin, 1 mg.; nicotinamide, 8 mg. pyridoxine hydrochloride, 0.5 mg.; folic acid, 1 mg.; and vitamin B₁₂ factors, 2 mcg.

Zymalixir is recommended for the treatment of nutritional anemias in both children and adults and for a dietary supplement in prevention of nutritional anemia during pregnancy.

Notes and Suggestions

by ALLEN V. R. BECK

Indiana University Medical Center is a university hospital and medical center catering to the welfare and indigent patients from the entire state of Indiana. The Medical Center is composed of three hospitals, the James Whitcomb Riley Pediatric Hospital, the Robert Long Hospital which is devoted to medical and surgical cases, and the Robert Coleman Hospital for obstetrics and gynecology. The total bed capacity of this medical center is 656.

The Pharmacy Department is located in the clinical building (a part of the Robert Long Hospital). On July 1st, 1950, the Manufacturing Room of the Pharmacy opened. This manufacturing room is the room in the top right-hand side of figure 1. The bottom half of this drawing is the warehouse on the right, and the ward box filling room on the left.

The purpose of this article is to point out some of the equipment purchased and why that particular model or manufacturer was chosen. The legend under figure 1, shows the location of each piece of equipment in the Manufacturing Room and gives the names, addresses and models of each piece of equipment in the Manufacturing Room.

Each piece of equipment was chosen after carefully checking the following points: (1) capacity, (2) ease of cleaning, (3) floor space required, (4) durability, (5) ease of operation, (6) cost of operation.

With the exception of the rollers on the ointment mill, all metal that comes into contact with the pharmaceutical is made of stainless steel. Stainless steel equipment is more expensive than other types but the durability and ease of cleaning offsets the increased cost.

SEMI-AUTOMATIC BOTTLER

Perhaps the most effective and practical piece of equipment we have is a U. S. Bottlers Machinery Company, Model B-2, Semi-Automatic Vacuum Bottler. This is located as number 11 in the floor plan and legend. The bottler is hand and foot operated. By pressing on the foot peddle the bottle holder or clover-leaf is lowered. Two empty bottles are placed in the clover-leaf. By releasing the foot peddle the clover-leaf is raised (by



U.S. Bottlers Semi-Automatic Vacuum Bottler Model B-2

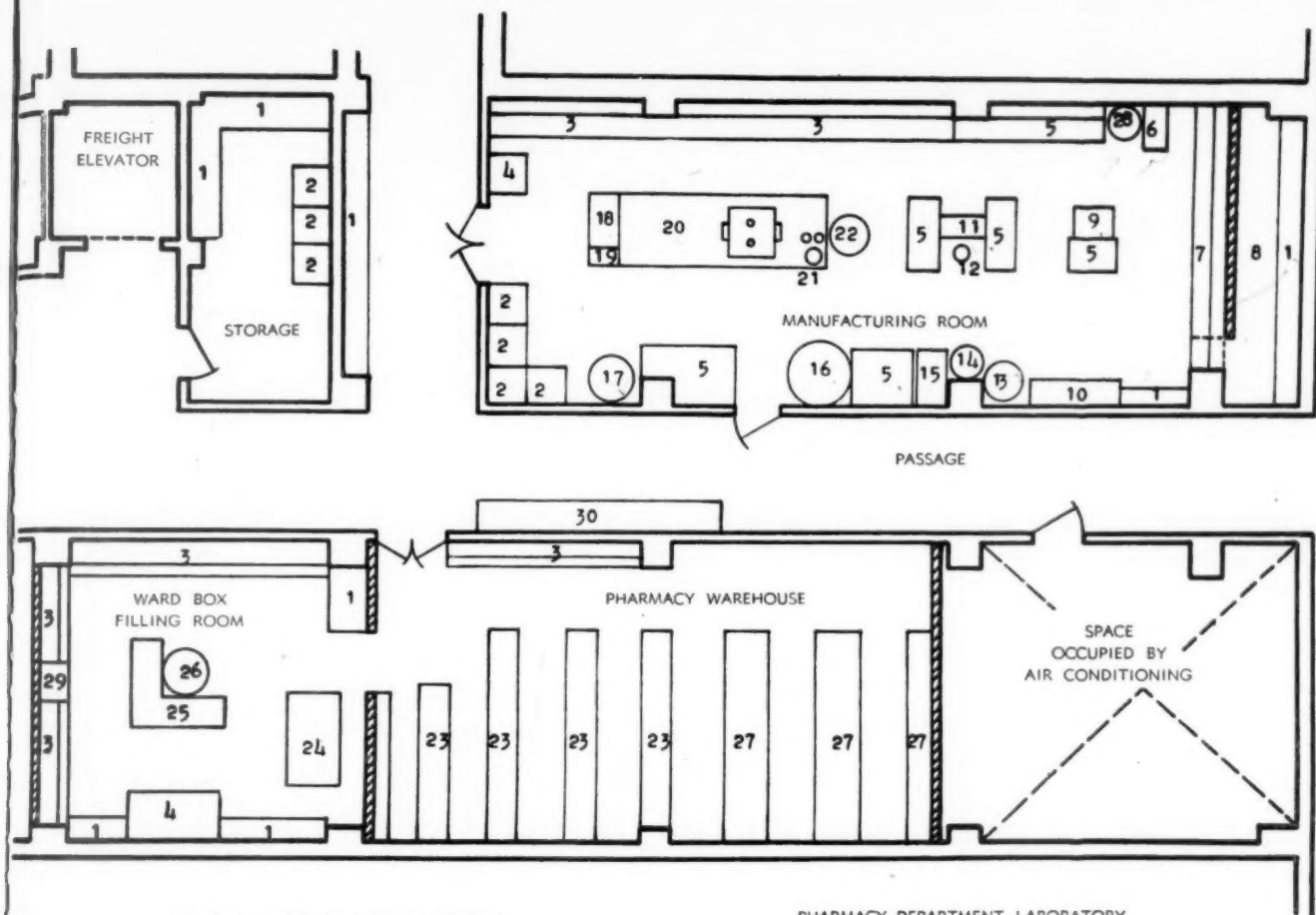
springs) to press the bottle neck against a soft rubber cushion, this provides an air-tight seal.

After the vacuum pump has exhausted the air from the bottles, atmospheric pressure pushes the liquid into the bottle. This continues until the liquid reaches the bottom of the filling stem. This type of filling stem prevents over-filling of the bottle. By pressing the foot pedal the vacuum is broken and the liquid stops flowing. The clover-leaf is then rotated 180 degrees and two more bottles are in position for filling by merely releasing the foot pedal.

This bottler is excellent for small production use in that it:

1. Has a relatively inexpensive first cost,
2. Maintenance is practically nil,
3. Is very flexible. We can fill 60, 240, liter or four-liter bottles with each of three type of

ALLEN V. R. BECK is chief pharmacist at the Indiana University Medical Center, Indianapolis, Indiana.



INDIANA UNIVERSITY MEDICAL CENTER
INDIANAPOLIS 7, INDIANA

PHARMACY DEPARTMENT LABORATORY
SCALE 10 FEET

Fig. 1.

LEGEND

1. STEEL SHELVES solid back open front 72" high
2. LIQUID STORAGE TANKS with pump 120 gallon capacity, Model 82, manufactured by Phillips Tank Co., Cincinnati, Ohio
3. STEEL SHELVES solid back open front 72" high ledge type. Manufactured by Berger Manufacturing Division, Republic Steel Corp. Canton 5, Ohio
4. REFRIGERATOR
5. WHITE ENAMEL BASE CABINETS with stainless steel tops cabinet. Manufactured by Tracy Manufacturing Co. Top cabinets manufactured by C & L Metal Shop, Indianapolis, Ind.
6. JAR MILL model 12A-30, Manufactured by International Engineering Co., Dayton, Ohio
7. WHITE ENAMEL BASE AND WALL CABINETS with stainless steel top
8. SMALL STORAGE ROOM with access through a panel in No. 7
9. ROLLER MILL (ointment) 5 x 12 Model B Manufactured by Chemicolloid Co., New York 7, N.Y.
10. COLLOID MILL Model M-D-1 Manufactured by Chemicolloid Co., New York 7, N.Y.
11. SEMI-AUTOMATIC BOTTLER Model B-2 Manufactured by U. S. Bottlers Machinery Co. Chicago, Ill.
12. FOAM TANK for Bottler Manufactured by U. S. Bottlers
13. STEAM JACKETED KETTLE, Model K-121, 35 Gallon Capacity. Manufactured by The Pfadler Co., Rochester, N.Y.
14. STAINLESS STEEL MIXING TANK with high-speed agitator, Model CV-4 25 Gal. Capacity.
15. STEAM AUTOCLAVE size 24 x 36. Manufactured by American Sterilizer Co., Erie, Penn.
16. STAINLESS STEEL MIXING TANK, 200 Gal. with Hydraulic Drive. Manufactured by Emerson-Schuering Tank Co., Indianapolis, Ind.
17. FILCOTED STORAGE TANK 200 Gal. Capacity. Manufactured by Filpaco Industries, Chicago, Ill.
18. DESK
19. FILE CABINET Two-Drawer
20. WHITE ENAMEL BASE CABINETS with Stainless Steel top sink. Size 36" x 36" x 18" available at this sink is hot water, cold water, distilled water, and compressed air. Manufactured by Tracy Manufacturing Co.
21. ELECTRIC STOVE-Model R-30, apartment size, Manufactured by Hot-point Inc. Chicago, Ill.
22. STORAGE TANK copper block tin lined 100 Gal. Manufactured by Atlas Copper and Brass Co., Chicago, Ill.
23. STEEL SHELVES solid back two-faced 72" high Manufactured by Berger Manufacturing Division Republic Steel Corp., Canton 5, Ohio
24. AIR CONDITIONER
25. WHITE ENAMEL BASE CABINETS with Formica Top, available on this top is hot water, cold water, distilled water, steam, compressed air, vacuum and gas. Manufactured by Cabinets Lvon Metal Products, Inc., Aurora, Ill.
26. SEMI-AUTOMATIC LABELER Model S. Manufactured by Economic Machinery Co., Worcester 3, Mass.
27. STEEL SHELVES solid back two-faced 72" high. Manufactured by Berger Manufacturing Division. Republic Steel Corp. Canton 5, Ohio
28. OINTMENT TUBE FILLER stainless steel model 2-C, Manufactured by F. J. Stokes Co., Philadelphia, Pa.
29. ELECTRIC DUMB WAITER to Pharmacy Dispensary Model Low-Rise. Manufactured by Otis Elevator Co., New York, N.Y.
30. STEEL SHELVES solid backs 72" high. Manufactured by Berger Manufacturing Division, Republic Steel Corp., Canton 5, Ohio.

liquids: foamy, viscous, regular—merely by changing filling stems, bottle holder, and centering rings.

4. Is operated on 110 volts extension cord.
5. Is portable. The unit is mounted on casters and can be rolled to the job.
6. Is powerful. For example will pull glycerin through tubing over a distance of 40-50 feet.
7. Will not fill cracked bottles or bottles with chipped necks.
8. Does not drip between bottle fills.
9. Rapid change over from one size bottle to another.

The capacity of this bottler, according to our records, with an inexperienced operator is:

60 cc bottles viscous liquid—35 per minute
240 cc bottles viscous liquid—25 per minute
1000 cc bottles viscous liquid—20 per minute
4000 cc bottles elixir-type liquid—2 per minute

With a bottler of this capacity the labor cost on any one unit is extremely low. This results in a lower per unit cost on prepackaged items.

ELECTRIC STOVE

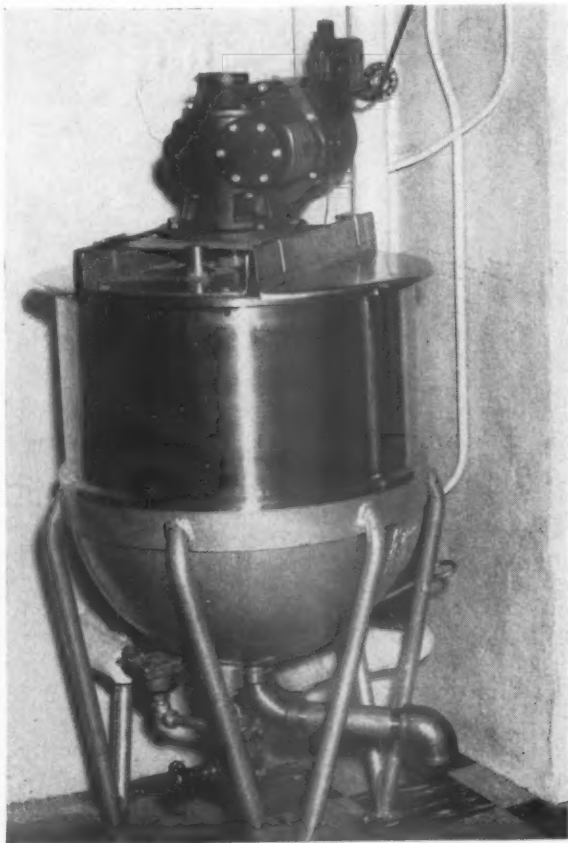
A ready source of heat is very important in a Manufacturing Room. A drying oven of some sort is also important. To provide both of these pieces of equipment, we purchased an apartment size electric stove. The top and the three burners were removed from the stove and proper holes and fittings put into the stainless steel top as shown in the accompanying illustration. This entire installation was made for considerably less money than a large hot plate and drying oven. Having the burners in the stainless steel top also permitted us to have a continuous top for the large work counter No. 20 in figure 1.



Electric Stove with stainless steel top and sink of stainless steel.

STEAM JACKETED KETTLE

The majority of our ointments are made by the hot process and then put through the roller mill. To secure a mixer that would provide the heat required, we purchased a steam jacketed kettle manufactured by the Pfaudler Co. This kettle has an anchor type agitator with scraper blades to keep the ointment from getting too hot by adhering to the sides of the kettle. The temperature in the kettle is automatically controlled with Minneapolis Honeywell controls. With this steam jacketed kettle, it is possible to make 30 gallons of simple syrup in only 13 minutes. This does not include filtration time but only the time required to put the sucrose in solution. This rapid solubility is made possible by the high heat available in this kettle along with the agitator. This kettle will carry 100 pounds of steam and is so certified by the manufacturer.



Steam Jacketed Kettle

STAINLESS STEEL COUNTERS

The tops on counters numbered 20, 5, and 7 in figure 1 are all of stainless steel. These tops are all of the following construction. The top layer is 16 gauge type, 302 stainless steel. This layer is sweat soldered to 16 gauge level-stretched sheet metal. These two layers are then fastened to $\frac{3}{4}$ inch seven-ply marine bonded plywood



A general view of the Manufacturing Room. Allen Beck is shown in the background.

by means of mastic. These tops provide a surface that is almost indestructible, easy to keep clean, and presents a very neat appearance. The stainless steel for these tops was supplied by "Armco", and the tops were fabricated by the C & L Metal Shop, of Indianapolis, Indiana.

The cabinets (wall and base) used in the Manufacturing Room are white enameled steel cabinets, manufactured by the Tracy Corporation, Pittsburg, Pa. These cabinets present a beautiful white appearance and are very easy to keep clean. These are not special cabinets, but rather the ordinary kitchen variety, manufactured by many companies.

ROLLER OINTMENT MILL

When using the kettle to manufacture ointments, the ointment, when just fluid, is withdrawn

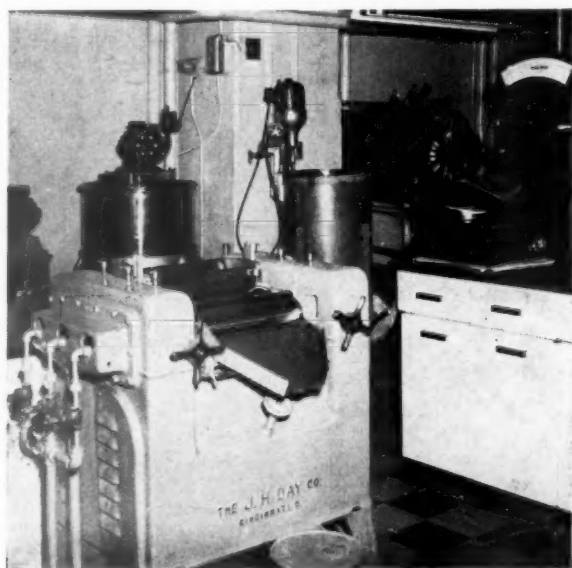
through the bottom valve and transported to the ointment mill as illustrated. As the rollers on the mill are water cooled, the ointment congeals upon contact with said rollers. After proper adjustment, this roller mill can produce about 100 lbs. of ointment per hour. With this capacity, the labor charged to manufacturing an ointment is very small.

BALANCES

In a Manufacturing Room a good reliable balance of large capacity is of utmost importance. To provide such a balance we chose a balance manufactured by the Howe Scale Co., Rutland, Vermont. This balance has a 5 kilogram dial divided into kilograms with the smallest division 10 grams. The counter-weights are all in the metric system. The balance of our choice as shown, has a capacity of 100 lbs. with a sensitivity of 4 grams. All pivot points of this balance are agate. The scoop or pan for the balance was made, upon special order, of stainless steel to provide a pan not affected by most chemicals.

All in all we tried to choose the equipment that would perform our particular job the best. We believe that the equipment described and pictured above is the best equipment available for the purpose for which it was purchased.

The description of this manufacturing equipment will be continued in a future issue of THE BULLETIN.



SHOWN LEFT.

Roller Ointment Mill.

Howe Balance is shown to right in photograph.

CURRENT LITERATURE

Edited by SISTER MARY ETHELDREDA, St. Mary's Hospital, Brooklyn, N.Y.

AMERICAN PROFESSIONAL PHARMACIST

JANUARY, 1952—"Pharmacy Organization in a Veterans Administration Center," by Charles U. Erdeljon, Chief, Pharmacy Service, Martinsburg, West Va. Describes the organization and responsibilities of the hospital pharmacy staff in the ever expanding facilities of a government hospital.

page 54

FEBRUARY, 1952—"Control of Floor Drugs" by William R. Collins, Chief Pharmacist, University of Illinois Research and Educational Hospital, Chicago. Describes a system of routine check and control of medications on floor, ward and clinic cabinets.

page 150

HOSPITAL MANAGEMENT

JANUARY, 1952—"How One Memphis Hospital Operates Its Outpatient Pharmacy," by Joe Sykes, Chief Pharmacist, John Gaston Hospital, Memphis, Tenn. A thought provoking article on a method of dispensing to outpatients in a southern hospital.

page 108

FEBRUARY, 1952—"Manufacturing in the Pharmacy" by Allen V. R. Beck, Chief Pharmacist, Indiana University Medical Center, Indianapolis, Ind. Discusses the several factors which must be considered and evaluated in a worthwhile manufacturing program.

page 94

HOSPITALS

JANUARY, 1952—"Hospitals' Retail Pharmacies Opposed." An announcement of the opposition of the American Pharmaceutical Association to the establishment of retail pharmacies in hospitals.

page 138

FEBRUARY, 1952—"Approved Hospital Techniques to Control Viral Hepatitis" by Charles U. Letourneau, M.D. and George Fleigh. An article of interest to hospital pharmacists in view of the importance of proper administration of parenteral medication in this connection.

page 97

MODERN HOSPITALS

JANUARY, 1952—"Adequate Sterilization Prevents transmission of Viral Hepatitis" by Richard B. Capps, M.D. Another article on this subject so

important today because of the prevalent ordering of medicinals by injection. *page 65*

"Control of Infection in the Operating Room Calls for Good Design and Safe Management" by Carl M. Walter, M.D. A detailed description of methods of maintaining asepsis in an operating suite. Describes sources of airborne bacterial contamination of a sterile field and methods of sterilization of textiles, solutions and instruments.

page 98

"Insecticides" by John G. Adams, B.S. Describes the most effective stomach poisons and contact poisons used to kill insects. *page 106*

"Drugs Affecting Intraocular Muscles" by H. L. Williams. A comprehensive presentation of Mydriatics, Cycloplegics and Miotics in use today. Describes the physiology and pharmacology of ciliary muscle and the Iris.

page 102

SOUTHERN HOSPITALS

JANUARY, 1952—"Administrative Qualities" by Herbert J. Mang, Chief Pharmacist, Foundation Hospital, New Orleans, La. Describes the characteristics of leadership essential for a successful administrator in a department.

page 54

FEBRUARY, 1952—"Professional Services the Pharmacist Can Render the Medical Staff" by Adela Schneider, Chief Pharmacist, Southern Pacific Hospital, Houston, Texas. Presents a phase of professional relations that has been neglected by hospital pharmacists.

page 62

HOSPITAL PROGRESS

FEBRUARY, 1952—"Hospital Pharmacy." Includes letter from Attorney General of New York State giving his opinion concerning the prescribing of narcotics by interns in hospitals. The opinion was requested by the Greater New York Chapter of the American Society of Hospital Pharmacists in an attempt to classify statements made in the 1951 Report of the ASHP Committee on Narcotic Regulations. The opinion states that in New York, medical interns may prescribe narcotics for *intra-hospital* use since they are eligible to practice medicine in the hospital. *page 82*

as the president sees it

WALTER M. FRAZIER

Springfield City Hospital, Springfield, Ohio



The Centennial Convention of the American Pharmaceutical Association is unquestionably the most important occasion of Pharmacy in our day. The ASHP is very proud to have the opportunity to participate in this event as an affiliated Society. Concurrently the American Society of Hospital Pharmacists is celebrating its own tenth anniversary. There could be no greater incentive for you to plan now to be present in Philadelphia for the entire week of August 17-23, 1952.

EXECUTIVE COMMITTEE MEETS

The Executive Committee of ASHP met in Dayton, Ohio, March 1 and 2, and devoted a great deal of attention to the plans for the annual meeting. Mr. Allen V. R. Beck, chairman of our Program and Public Relations Committee was authorized to proceed with plans to appropriately arrange the program. Knowing Allen and the members of his Committee, we anticipate excellent results. Secretary Niemeyer has sent a letter to the affiliated chapters inviting ASHP members to submit papers for presentation at the meeting. This invitation is of course open also to ASHP members. If you would like to submit a paper please contact Mr. Beck soon.

This year the ASHP House of Delegates will hold its first meeting on Sunday afternoon August 17. At this time we will establish a precedent in having an inaugural address of the president-elect. Much important Society business can be developed and considered by the House of Delegates. The affiliated chapters should begin now to appoint and instruct their official delegates. The affiliated chapters should use this opportunity to send reports, resolutions, recommendations and to present pertinent subjects which they wish to have considered or reviewed.

The main meetings of ASHP are scheduled for Thursday and Friday of the convention week. On Thursday morning we will have our traditional ASHP breakfast. On Friday night we will have a special decennial banquet. Hospital pharmacists will have the opportunity to attend all of the inspiring and informative general sessions of the A.Ph.A. on Monday, Tuesday and Wednesday.

Progress was reported on preparation of the history of ASHP which will be presented at the annual meeting. The committee expressed great enthusiasm for this project and arrangements for the publishing the history were authorized.

The Executive Committee approved and elaborated on the plans for financing the special decennial observances. Your gift to the Decennial Program Fund will directly support the preparation and publishing of the history, as well as other outstanding features of this anniversary meeting.

The Committee to Plan the Institute on Hospital Pharmacy reported on the program for the Institute to be held in Toronto, Ontario, Canada, June 23-27, 1952. Announcements and application forms for the Institute will be sent out soon.

The report of the Committee on Pharmacists in Government Service was presented by Chairman Charles Towne. The committee has been studying the situation in connection with a recommendation of the National Association of Boards of Pharmacy which suggested that six months apprenticeship credit be given for pharmacy experience gained in the armed forces. We believe this recommendation should be clarified or changed. We are confident that each State Board will immediately establish full credit for experience gained in pharmacy in the services when that experience equals the standards of civilian practice. There certainly must be good hospitals and dispensaries in many military installations wherein the pharmacy is under the supervision of a registered pharmacist.

Basic and educational work of the Committee on Minimum Standards is being continued by Mr. Bowles and his Committee.

Favorable results and amazing amounts of work were reported by Mrs. Jane Rogan, chairman of the National Committee and the Subcommittee on Membership and Organization.

The Executive Committee was highly impressed with the response from the affiliated chapters as presented in a report from Mrs. Evelyn G. Scott, chairman of the Project Committee.



A.S.H.P. AFFILIATES

At the February 17 meeting of The ARIZONA SOCIETY OF HOSPITAL PHARMACISTS, the group discussed plans for working with the state nurses association in an effort to bring about greater cooperation between the two professions thereby providing better pharmacy service. It was decided that President Eli Schlossberg would write a letter to the head of the Arizona Nurses' Association offering the services of the pharmacists.

Work was also inaugurated on a project to study the cost and selling price of drugs in the various hospitals so that a more uniform buying and pricing schedule might be worked out. In carrying out this project, members were asked to submit a list of all the drugs used in quantity in their respective hospitals with their buying and pricing schedule.

Plans were made to hold the next meeting of the Arizona Society on Sunday, March 16 at the Veterans Administration Hospital in Tucson.

Members of the ILLINOIS CHAPTER OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS heard Mr. James R. Gersonde, executive director of the Chicago Hospital Council at their December 11 meeting. He discussed "Recent Factors Affecting the Hospital Field."

At the February 12 meeting of the Illinois Chapter, Dr. Walter Camp, professor of pharmacology and toxicology, University of Illinois, spoke on "Toxicology."

The NORTHEASTERN NEW YORK SOCIETY OF HOSPITAL PHARMACISTS met on Wednesday, January 23, for a dinner meeting and tour through the Sterling-Winthrop Research Institute. Guests included hospital administrators and other hospital personnel. Speakers at the meeting were Dr. George Wessinger who spoke on Norepinephrine, giving its background and comparison with epinephrine; and Dr. Rudolph Pauley who discussed hospital pharmacy practice in Beirut, Lebanon.

Sister pharmacists of the GREATER NEW YORK CHAPTER OF THE ASHP met at St. Peter's Hospital in Brooklyn on Wednesday, January 16. The entire meeting was devoted to a study of the details of preparing a written policy

for carrying out the administrative phase of hospital pharmacy. Subjects covered included pharmacy hours; filling emergency orders; after hour calls, other than emergency; explanation of various forms; standard drug arrangement of internal and external medications on the shelves of the medicine cabinet in each hall; handling the problem of verbal orders; and the disposition, recording and accounting for losses of narcotics, barbiturates, etc.

At the February 20 meeting of the Greater New York Chapter held at Mary Immaculate Hospital in Jamaica, the film "Through the Prescription Window," was shown through the courtesy of E. R. Squibb. The remainder of the meeting was devoted to exchange of ideas and plans for future meetings.

Sixteen members and five guests attended the January 24 meeting of the MIDWEST ASSOCIATION OF SISTER PHARMACISTS, held at St. Joseph Hospital in Elgin, Ill. Those attending came from as far as Chicago, Elgin, Aurora, Joliet, Urbana, Danville and Rockford.

Two outstanding papers were presented—"The Durham Humphrey Act" by Sister M. Theodora, O.S.F., Joliet; and "The Trends in Penicillin Therapy" by Sister M. Richarda, O.S.F., Rockford. Both papers brought forth interesting discussions and an opportunity for additional views to be expressed.

Members of the MASSACHUSETTS SOCIETY OF HOSPITAL PHARMACISTS were guests of the Wyeth Company for the January 16 meeting. Also present were members of the faculty of the Massachusetts College of Pharmacy. The program included a talk by Mr. Philip H. Van Italic, editor of *Pulse of Pharmacy*, and a film on the uses of Hyaluronidase.

The OKLAHOMA SOCIETY OF HOSPITAL PHARMACISTS held a business meeting at St. Anthony Hospital in Oklahoma City on January 16. The meeting was presided over by Mr. Ralph Reed, chairman of the Committee on Constitution and By-Laws. After considerable discussion, the Constitution was adopted according to that of the national organization.

Miss Marguerite Marie Jones, chief pharmacist at Hillcrest Memorial Hospital in Tulsa, was unanimously elected first vice-president to fill the vacancy created by the resignation of Mrs. Elaine Haddad.

Mr. Theodore Mink of People's Hospital in Akron, presented a paper on isotonicity, buffering and preservation of solutions, at the February meeting of the AKRON AREA SOCIETY OF HOSPITAL PHARMACISTS. This group is carrying out an Educational Program headed by Russell Lovell. At the next meeting, a panel discussion is planned on the value of the Pharmacopeia to practicing hospital pharmacists, with the following members participating: Harriet Finney, Berenice Jack, William Derek; Dorothy Blumer, Elnorah Drury and Russell Lovell. Another phase of the Project will be a report each month by individual members on items of interest taken from all of the current literature, each member editing two or more of the journals.

A movie on Vinethene (Merck and Co.) was shown at the January 30 meeting of the CLEVELAND SOCIETY OF HOSPITAL PHARMACISTS. Included in the business session was a discussion of plans for the pharmacy group meeting in connection with the Catholic Hospital Association convention in May. The Cleveland Society also accepted an invitation from the Akron Area Society for a joint meeting on April 30, and announcement was made of the convention of the Ohio Society being held in Cleveland March 31, and April 1 and 2.

Miss Jacqueline Young of Lutheran Hospital was elected secretary of the Cleveland Society to replace Miss Elizabeth Cestaric.

A Laboratory Demonstration in Pharmacology was presented at the February 16 meeting of the MIDWEST ASSOCIATION OF HOSPITAL PHARMACISTS. This was in charge of The Biological Science Department of The Creighton University College of Pharmacy with Mrs. Edmund Czerwinski and Mr. Frank Ferraro as instructors. Included in the demonstration were the following: Official Assay of Epinephrine; Autonomic Reactions of Heart; Smooth Muscle Contraction; Nicotine Poisoning in Mammals; Straub Mouse Tail Test; Insulin Convulsions in Mice; and Assay of Curare Preparations by Head-Drop Method.

The WISCONSIN SOCIETY OF HOSPITAL PHARMACISTS met at Milwaukee Children's Hospital on January 18. "New Products—The Life Blood of Pharmacy," was the subject of a talk

presented by Mr. R. L. Schlick, District Manager, Chicago Division of the E. R. Squibb.

During the business session, the president, Sister Gladys Robinson, appointed the following committee to meet with the faculty of the University of Wisconsin School of Pharmacy to make plans for the establishment of a course in hospital pharmacy at the University: *Chairman*, Ernest Kuenzi; Dolores Mross; Sister Mary Blanche, O.S.F.; and Earl Jensen. Other business included announcement of the activities of hospital pharmacists in the Civilian Defense program in Milwaukee County, and clarification of the statement in the Minimum Standard concerning the educational requirements.

New officers were installed at the January 9 meeting of the SOUTHERN CALIFORNIA CHAPTER OF THE AMERICAN SOCIETY OF HOSPITAL PHARMACISTS held at the Santa Fe Hospital in Los Angeles. The new president, Mrs. Norma Irish, E.E.N.T. Hospital, thanked the membership for their confidence and expressed the desire for an outstanding year.

The NEW JERSEY SOCIETY OF HOSPITAL PHARMACISTS is keeping its membership informed by a series of letters from the president, Rudolph Wilhelm. Current activities include participation in "The Joint Survey Committee of Hospital Pharmacy Administration" which is made up of representatives of the New York Hospital Pharmacists Association, Rutgers University Extension Service, and the colleges of pharmacy in the New York area.

New committee chairmen of the New Jersey Chapter are Larry Pesa, Program and Publicity; Anna Richards, Organization; Morris Goldman, Membership; Herbert Falk, Finance; and Evelyn Carlin, Publications.

New officers of the NORTHERN CALIFORNIA SOCIETY OF HOSPITAL PHARMACISTS elected at the December 11 meeting are: Jack S. Heard, president; Charles J. Bertrand, vice-president; Alphonse A. Seubert, secretary; and Patrick V. Crichton, treasurer. The guest speaker at this meeting was Mr. Gene E. Salisbury, executive vice president of the Association of California Hospitals who spoke on public health legislation.

At the January 8 meeting the new officers were installed and committee appointments made for 1952. Among the committees active in the Northern California Chapter are: Program, Arnold H. Dodge, chairman; Membership and Publicity, Charles Bertrand, chairman; Bulletin editor, Jerome Yalon; Placement Bureau, Francis Spinelli; and Projects Committee, Clara Henry.

NEWS ITEMS

Edward Spease Honored by Hospital Pharmacists

Edward Spease, formerly dean of the School of Pharmacy at Western Reserve University in Cleveland has been named to receive the 1952 H. A. K. Whitney Lecture Award by the Michigan Society of Hospital Pharmacists. The Award, established in honor of the first chairman of the American Society of Hospital Pharmacists, is presented annually to a person who has made outstanding contributions to hospital pharmacy.

The selection of Mr. Spease was made in recognition of his many contributions to hospital pharmacy which included the development of the



first *Minimum Standard for Pharmacies in Hospitals* which was accepted in 1936 by the American College of Surgeons at a meeting in San Francisco. The first graduate course in hospital pharmacy was organized and directed by Dean Spease beginning in 1937. His educational interest in hospital pharmacy

was further exhibited by his offering instruction in hospital pharmacy to all undergraduate pharmacy students at Western Reserve at the time. Dean Spease's many articles which appeared in hospital publications during the 1930's reflect the work of a hospital pharmacy pioneer who recognized the need for the pharmacist to become an active member of the professional team in hospitals. He advocated the establishment of hospital pharmacy internships, the use of a formulary in hospitals and the establishment of a pharmacy and therapeutics committee. Mr. Spease has been previously distinguished for his work in hospital pharmacy with an honorary Master of Science degree from the Philadelphia College of Pharmacy and Science in 1936.

The Award will be presented at a banquet which will be held in Detroit, May 1st at the Henry Ford Hospital.

Institute on Hospital Planning

Grover C. Bowles, chief pharmacist at Strong Memorial Hospital in Rochester, N. Y., participated in the Institute on Development of Hospi-

tal Plans held in New York City, February 11-15. Taking part in a session on "Facilities To Provide Necessities for Bedside Care," Mr. Bowles pointed out the important role played by the pharmacy in the operation of the modern hospital. He stressed the need for adequate space, mechanized equipment, suitable casework and proper storage facilities, along with the advantages of manufacturing not only pharmaceutical preparations but also products for the housekeeping, engineering, laundry and other hospital departments. He also emphasized the importance of early participation by the pharmacist in the planning of the pharmacy facilities for new construction and suggested the use of the consulting services offered by the Division of Hospital Pharmacy.

The Institute was sponsored by the American Hospital Association and was attended by 125, thirty-five of whom were architects.

International Congress of Hospital Pharmacists

The First International Congress of Hospital Pharmacists is scheduled to meet in Basle, Switzerland, September 17-19, 1952. The program will include scientific subjects, a discussion of administrative problems, technical papers on pharmaceutical fabrication, demonstrations of apparatus and pharmaceutical machinery, and visits to the pharmacy of the Basle Hospital and to the Pharmaceutical Museum.

American hospital pharmacists who would like to present a paper at this Congress or to participate in this program are invited to write to Dr. K. Steiger, Pharmacie Cantonale, Zurich, Switzerland. It would also be appreciated if those planning to attend would notify the secretary of the Society, Gloria Niemeyer, 2215 Constitution Avenue, N. W., Washington 7, D. C.

Southeastern Society Establishes New Groups

Two new local hospital pharmacy organizations have recently organized. These are the Georgia Society which met in Atlanta and the Houston (Texas) Society.

CHA Institute on Hospital Pharmacy

The Catholic Hospital Association's annual Institute on Hospital Pharmacy is scheduled for May 24-28 in Cleveland. It will be held in conjunction with the Association's annual convention. The program will include sessions on the Pharmacy and Therapeutics Committee, New Drugs, Compiling the Formulary, Application of the Minimum Standard, Hospital Pharmacy Administration, Equipment for Manufacturing, Proper Labelling, Drug Addiction and Accuracy in Filling Prescriptions and Pricing.

Public Health Service Internships

The U. S. Public Health Service has announced a one-year, non-academic, hospital pharmacy internship beginning July 1, 1952. The program will be offered first at the Public Health Service Hospital in Baltimore, Md. This is a general hospital with a bed capacity for 400 patients. The training will include work in pharmacology, biochemistry and pharmacy administration, preparing the pharmacists to serve as drug therapy consultants to the staff and department managers of the hospital. Also, the program will meet the requirements of the Minimum Standard for Pharmacy Internships in Hospitals.

A candidate selected for an internship in a U. S. Public Health Service Hospital must be eligible for commission in the grade of Junior Assistant Pharmacist (equivalent to 2nd Lieutenant or Ensign) in the Reserve Corps of the Public Health Service. Interns so commissioned will serve on active duty status and will enjoy all the rights and privileges of a commissioned officer. The annual pay and allowances are \$3969 for those with dependents, \$3789 for those without dependents, and with no previous military service.

Candidates for Public Health Service hospital pharmacy internships are selected from recent graduates of approved colleges of pharmacy. An applicant for an internship in hospital pharmacy administration must be a citizen of the United States, and must satisfactorily pass a physical examination performed by medical officers of the U. S. Public Health Service.

The qualified pharmacists who apply and are accepted for internship in the U. S. Public Health Service Hospitals will find a unified coordinated program. A training officer has been assigned to this program and every effort is made to see that the graduates from this internship, through lectures, conferences, assignments to and actual work in the various departments, will develop a background in hospital pharmacy administration, which will permit them to accept responsible government or civilian positions as chiefs of pharmaceutical services. Upon satisfactory completion of the internship, opportunities are often available in hospital pharmacy in the Public Health Service Division of Hospitals for career pharmacy officers. A pharmacy intern certificate is granted to the intern upon satisfactorily completing his internship.

Eventually, it is planned to have seven U. S. Public Health Service Hospitals offering a one year non-academic pharmacy internship. These will be located at Baltimore, Md., Boston, Mass., New Orleans, La., Norfolk, Va., San Francisco, Calif., Seattle, Wash. and Staten Island, N. Y.

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Members of VA's Special Pharmacy Training Committee. Left to right: I. T. Reamer, Don E. Francke, Admiral Joel T. Boone, W. Paul Briggs, W. Arthur Purdum and E. Burns Geiger.

Veterans Administration Proposes Academic Program

A two-year residency or academic training program has recently been recommended by the VA's Special Pharmacy Training Committee. Those eligible for the program must be recent pharmacy graduates with B.S. degrees and registered in one of the States. According to the proposed plan, academic study leading to a master's degree will be offered concurrently with on-the-job training in pharmacies in VA hospitals. This will be under the supervision of a VA chief pharmacist and will include all phases of hospital pharmacy operations. The Committee also recommended that the pharmacy training be integrated with other professional training programs in VA hospitals.

The academic training will be offered in affiliated colleges and universities which are located near adequately staffed and equipped VA hospitals.

It was also recommended that the standards as adopted for the VA program conform with the Minimum Standard for Pharmacy Internships in Hospitals as established by the American Society of Hospital Pharmacists and which is now being studied by the Division of Hospital Pharmacy.

In the Committee's report to VA's Chief Medical Director, Vice Admiral Joel T. Boone (M.C.) USN, Rtd., the following statement is made:

The Committee is of the unanimous opinion that the implementation of the above hospital pharmacy training program will materially improve the practice of hospital pharmacy in Veterans Administration. We are pleased to assume responsibility for giving continuing attention to the problems of pharmacy in Veterans Administration, and, will at the call of the Chief Medical Director, resume its study of additional training programs that might be indicated or considered desirable

in achieving the goal of the best possible medical service for veteran patients.

Members of the Committee meeting in Washington on January 31 and February 1 are: Dr. W. Paul Briggs, secretary and executive director, American Foundation for Pharmaceutical Education; Dr. Don Francke, chief pharmacist, University of Michigan Hospital and president of the American Pharmaceutical Association; Dr. Arthur Purdum, chief pharmacist, Johns Hopkins Hospital; and I. T. Reamer, chief pharmacist, Duke University Hospital.

National Pharmacy Week Commendation

Special commendation was given the display for National Pharmacy Week at Springfield City Hospital, Springfield, Ohio. Pharmacists responsible for the exhibit are Walter M. Frazier and Neal Johnston.

Executive Committee Meets

Meeting in Dayton, Ohio on March 1 and 2, all members of the executive committee were present including: Walter M. Frazier, Jane L. Rogan, Gloria Niemeyer, Sister Mary Raphael, Grover C. Bowles, Allen V. R. Beck, Charles G. Towne and I. Thomas Reamer. Don E. Francke, as director of the Division of Hospital Pharmacy and editor of *THE BULLETIN*, was present by invitation. Detailed information on the committee's activities are reported by President Frazier on page 137 of this issue of *THE BULLETIN*.

Axelrod Elected President

David Axelrod, chief pharmacist at Maricopa County Hospital, Phoenix, Ariz., has recently been elected president of the Maricopa County Pharmaceutical Association. Mr. Axelrod is also active in the Arizona Society of Hospital Pharmacists.

Lester Appointed to Hospital Council

Mr. Louis C. Lester, chief pharmacist at Harper Hospital, Detroit, has been appointed to the Council on Professional Practice of the Michigan Hospital Association for a three year term which expires in 1954. Mr. Lester is an active member of the ASHP and was the first president of the Michigan Society of Hospital Pharmacists.

1952 Blue Book Issued

Release of the 1952 *American Druggist Blue Book* has been announced. Containing a total of 83,462 new products and price changes, it is said to be the largest national drug price book ever published. In addition to listing the latest fair

trade prices, the *Blue Book* includes a directory of manufacturers, a "Merchandising Manual," a "Store Equipment Section," and the "Prescription and Prescription Accessories Section." Copies are mailed to drug stores registered with the state boards of pharmacy and additional copies are available at \$5.00 each from the *American Drug-gist Blue Book*, 572 Madison Avenue, New York 22, N. Y.

Rees Promoted

Paul T. Rees has been promoted to the position of Sales Manager of Bristol Laboratories. He was formerly Field Sales Manager and has been with Bristol since 1946. Mr. Rees was with the U. S. Navy from 1914 to 1946 retiring with a rank of Commander.

Parker to Chicago Clinics

Mr. Paul Parker has been appointed chief pharmacist at the University of Chicago Clinics. Mr. Parker received his Master of Science degree in pharmacy from the University of Michigan in June, 1951 and at the same time completed the internship program at the University of Michigan Hospital. Since that time he has been a member of the Pharmacy staff at the University Hospital and also assistant editor of *THE BULLETIN*.

Papers for Annual Meeting Requested

ASHP members are asked to contribute papers for presentation at the annual meeting being held in Philadelphia during the week of August 17. Approximately twenty minutes will be allowed for presentation of each paper, and, if it is too long to present in this time, abstracts can be given and the papers will be considered for publication. Papers can also be submitted by title and abstract if the author cannot be present at the meeting. The title, and if possible, an abstract of papers, should be forwarded not later than May 1, to: Allen V. R. Beck, Chairman, ASHP Committee on Program and Public Relations, Pharmacy Department, Indiana University Medical Center, Indianapolis, Ind.

Ralph Stone to Vanderbilt

Mr. Ralph Stone has been appointed chief pharmacist at the Vanderbilt University Medical Center in Nashville, Tennessee. Mr. Stone is a graduate of Howard College of Pharmacy in Birmingham, Alabama and he was the first pharmacy resident at the Vanderbilt University Medical Center. Mr. Stone is a native of Lynchburgh, Tennessee, and he succeeds the late Robert W. Bond of Nashville.

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TO MARCH 30

President Walter Frazier has inaugurated plans for establishment of a special fund known as the "Decennial Fund of the ASHP." This is done in order that we may carry out certain special activities in connection with the tenth anniversary of the Society. Members have responded with great enthusiasm and we anticipate continued interest during the next several months. Already in less than one month since President Frazier's letter was sent, nearly 100 ASHP members and three local chapters have contributed. Again, this shows personal appreciation of your organization and continued interest in furthering the objectives of the Society.

OUR GOAL

EVERY MEMBER A CONTRIBUTOR

	Dollars	Members	Affiliated Chapters
Goal	\$6000	1850	29
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	5200	1750	26

ASHP MEMBERS

Adams, Chauncey, C., U. S. Naval Hospital, Jacksonville, Fla.
 Banning, Jennie M., Saginaw General Hospital, Saginaw, Mich.
 Barnett, Lorena, Cowell Memorial Hospital, Berkeley 4, Calif.
 Barr, Martin, Philadelphia Coll. Pharm. & Sci., Philadelphia, Pa.
 Bauer, E. J., Parke, Davis Company, Detroit 32, Mich.
 Bavy, Benjamin M., 6850 Louis XIV St., New Orleans, La.
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 Canai, Victor V., 40 Forest St., Providence 5, R. I.
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 Crotwell, Johnnie, Georgia Baptist Hospital, Atlanta, Ga.
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 Sister M. Anselma (Betzen), Holy Family Hospital, Estherville, Ia.
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 Statia, Perrin, Kitchener-Waterloo Hospital, Ontario, Canada
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 Weiss, Eve, St. Luke's Hospital, Cleveland, Ohio
 Wegemer, Norbert R., Little Traverse Hospital, Petoskey, Mich.
 Wexlar, Benjamin J., 2601 Parkway, Philadelphia, Pa.
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Nowak, Marian, Lake & Williams Sts., Greenwich (A)

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Ruth, Stephen W., Marriottsville

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Philadelphia (A)
Barr, Dr. Martin, Philadelphia Coll. of Pharm. &
Science, Philadelphia (A)
Miller, Norman A., 865 W. Walnut Lane, Phila-
delphia (A)
Tyler, Ens. Joseph M. MSC, U. S. Navy, U. S. Naval
Hospital, Philadelphia

TENNESSEE

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Stephenson, Max F., 526 Western Dr., Memphis
Stone, Ralph, Vanderbilt Univ. Hospital, Nashville

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UTAH

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Harrison, Margaret, 304 Robert Ave., Richland
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POSITIONS OPEN

NEW JERSEY—Opening for assistant pharmacist registered in N. J. 300-bed hospital upon completion of new wing in June; 5½-day week; starting salary \$4000 per year. Address inquiries to I. L. Ernst, Administrator, Monmouth Memorial Hospital, Long Branch, N. J.

PHARMACIST WANTED—265-bed general hospital in Wisconsin offers excellent opportunity for a registered woman pharmacist. State qualifications in letter addressed to Division of Hospital Pharmacy, 2215 Constitution Ave., N. W., Washington, D. C. (PO-3)

CHIEF PHARMACIST—Full charge of 600-bed, voluntary hospital pharmacy, located New York City. Send complete resume to Division of Hospital Pharmacy, 2215 Constitution Ave., N. W., Washington, D. C. (PO-4)

MARYLAND—Registered pharmacist for large general hospital. Modern manufacturing and dispensing pharmacy. Five day week with good starting salary. Contact Director of Personnel, Baltimore City Hospitals, 4940 Eastern Avenue, Baltimore 24, Md.

MICHIGAN—Opening for pharmacist; male preferred but will consider female; \$3600 to start. For further information contact Mr. Leo Godley, Bronson Methodist Hospital, Kalamazoo, Mich.

The following openings in hospital pharmacy appeared in current issues of hospital publications. Anyone interested in the positions should write directly to the Agency indicated. A fee is charged when positions are secured through the services of a personnel agency.

PHARMACISTS—(a) Large Kentucky hospital, city 50,000; \$4800. (b) New 200-bed Virginia hospital, city 35,000 vicinity state capital; \$5400. (c) Large general hospital, southern California college town; \$4200-4800. (d) 200-bed Illinois hospital, college town near state capital; \$5400. (e) Large hospital San Francisco Bay area; \$4200; 44-hour week. Woodward Medical Personnel Bureau, 185 N. Wabash, Chicago 1, Ill.

WANTED—(a) **CHIEF PHARMACIST**: voluntary general hospital currently under construction; 400 beds; administrative ability, hospital experience required; university town, South. (b) **PHARMACIST** with advanced training in chemistry or pharmacy; key position with pharmaceutical company; duties: application research. (c) **PHARMACIST**; detail position; new pharmaceutical company. (d) **CHIEF**; qualified design and reorganize new department, general hospital; Pacific Northwest. (e) **CHIEF**; 300-bed hospital; university town, Midwest. (Please send for ANALYSIS

FORM so we may prepare an Individual Survey for you.) Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago, Ill.

POSITIONS WANTED

REGISTERED PHARMACIST with B.Sc. and to receive M.S. in Pharmacy in June desires position in area east of Mississippi Valley. Has had both retail and hospital experience in addition to formal internship. For further information contact the Division of Hospital Pharmacy, 2215 Constitution Ave., N. W., Washington 7, D. C. (PW-4)

MALE PHARMACIST—completing pharmacy internship at Freedmen's Hospital, Washington, D. C. July 1, desires position in hospital pharmacy. B.S. degree Wayne Univ., Detroit. Reg. Mich., N. C., and D. C. Eligible for registration in most states. Both retail and hospital pharmacy experience. For further information please write to Division of Hospital Pharmacy, 2215 Constitution Ave., N. W., Washington, D. C. (PW-3)

NINE JUNIOR STUDENTS, pharmacy majors, at the Philadelphia College of Pharmacy and Science have designated interest in a position in a hospital pharmacy for the summer months, June-September 1952. Will accept work in the middle eastern states. Some will work for room and board; others must obtain a fair wage for their services. All are experienced in retail pharmacy. Contact H. L. Flack, Jefferson Medical College Hospital, Philadelphia, Pa. if you can use such a person.

The Division of Hospital Pharmacy of the American Pharmaceutical Association in cooperation with THE BULLETIN maintains a placement service for hospital pharmacists. Anyone interested in availing themselves of this service may write to the Division giving pertinent information in regard to education and experience. A notice will be placed in THE BULLETIN on request. Adequate information about the person's qualifications as well as the type and size of institution in which he wishes to work, location, etc., is essential.

The service does not undertake to recommend applicants, but aims to serve as a clearinghouse for hospital pharmacists interested in positions and for hospitals interested in employing a pharmacist. Individuals will be notified by letter of openings which they may be qualified to fill. Requests for positions are kept on an active file until the Division is notified that the person has accepted a position or is no longer interested.

There is no charge for this service. All communications should be addressed to The Division of Hospital Pharmacy, American Pharmaceutical Association, 2215 Constitution Ave., N. W., Washington, D. C.